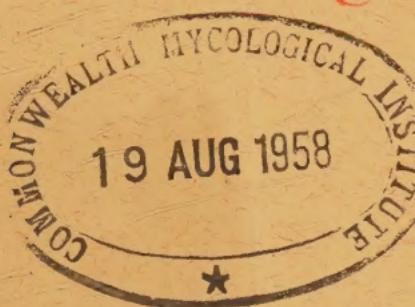


A TRIBUTE TO
DR. J. J. DAVIS

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HERB.



... DR. J. J. DAVIS



The memorial service at the University Club for my father was so perfect a tribute and one that he would have so deeply appreciated, not only because of what was said but because of his affection and respect for those who spoke, that the spirit of that tribute is here preserved for his friends.

Marguerite Davis

DR. JOHN JEFFERSON DAVIS

By Charles E. Allen

AS MOST of you know, Dr. Davis' professional life was divided into two not very unequal parts, during the second of which the avocation of the first part became his vocation.

It is not easy to determine just when his active interest in botany began. As he has told us the story, he was interested first in collecting and naming the seed plants which he observed in his country travels. In so doing he was following a tradition that had long persisted among physicians—one traceable to the earliest Greek botanical works, in which the interest manifested in plants is primarily an interest in their medicinal uses.

In collecting the larger plants, Dr. Davis—naturally, perhaps, as a physician—took note of their diseases, and then of the fungi which were producing the disease. It was his inter-

est, thus directed to the parasitic fungi, which was to determine the course of his later activities.

We know that Dr. Davis was a member of the Botanical Club of the American Association for the Advancement of Science as early as 1885, for his signature appears on the register of members of the Club attending the meeting held in August of that year. We know, too, that he was present at the historical meeting of the Club in connection with the meeting of the American Association in Madison in August, 1893. It was at this time that a botanical section of the Association was first organized, and that the Botanical Society of America was founded.

Dr. Davis had been early active in the meetings of the Wisconsin Academy of Sciences, Arts, and Letters. Later, from 1902 to 1905, he served as president of the Academy. In 1884, William Trelease, then professor of botany at the University of Wisconsin, pub-

lished in the *Transactions* of the Academy a "Preliminary List of the Parasitic Fungi of Wisconsin." When, in the following year, Dr. Trelease went to the Missouri Botanical Garden, Dr. Davis felt that the work so auspiciously begun should be continued. It was in 1893 that he published, also in the *Transactions*, his first "Supplementary List of Parasitic Fungi of Wisconsin." Further "Supplementary Lists" appeared in 1897, 1903, and 1909.

In 1911, Dr. Davis retired from the practice of medicine in Racine, and came to Madison as Curator of the University Herbarium. In the somewhat more than twenty-five years since, he has continued the collection and study of the parasitic fungi of the state.

In 1914 the material included in the lists already published, together with the results of further collections, was combined and published as "A Provisional List of the Parasitic Fungi of Wisconsin." Here the species are listed, first, systematically according to the

names of the fungi, and second, under an alphabetically arranged list of hosts. His studies of collections made since then have been reported in the form of "Notes on Parasitic Fungi in Wisconsin," of which nineteen have appeared and number 20 is in press. In general, each series of "Notes" summarizes the results of one season's collections, which were examined, identified, and described during the following winter.

For some time Dr. Davis has had under way a compilation of all the accumulated and published work, to be issued as a single list—perhaps another "provisional" list but now of sad necessity a final list, so far as his work is concerned—of the parasitic fungi of the state. This list is complete in card form, the very final touches having been given it on the last day of his life, so that it will in due time appear in print.

Mention is not made here of Dr. Davis' incidental publications, all, I think, so far as they

relate to botanical problems, having appeared, like those already listed, in the *Transactions of the Wisconsin Academy*. One, however, should be named; a monograph of "North American Ascochytae," published in 1919.

It is in consequence of the long, painstaking work of Dr. Davis that the parasitic fungi of Wisconsin are so well known. It has been said by those competent to judge that the members of this group of plants are more fully known for Wisconsin than for any other state. However well the superlative may be justified, it is true that botany in general and Wisconsin botany in particular are indebted to Dr. Davis for a masterly and comprehensive series of studies in a most important field. It is a pleasure for a Wisconsin botanist to pay this slight tribute to his memory and to that of his accomplishments.

JOHN JEFFERSON DAVIS

By Edward M. Gilbert

BORN in Davis, Illinois, in 1852, of pioneer parents, he became the youngest member of the first class graduated from the University of Illinois, received his M.D. from Hahneman in 1875. He began practice in association with Dr. L. Sherman, then one of Wisconsin's best known physicians. Dr. Davis continued his practice at Racine, where he remained for many years successful and much beloved.

Clearly born to be a scientist, he found his recreation in collecting and studying the flora of Racine and its vicinity. Finding many of the plants diseased, he submitted them to Dr. Farlow of Harvard, and other mycologists, soon turned to the study of mycology himself and finally at the advice of Farlow restricted his efforts to rust fungi and the fungi imperfecti. At the time of his death he was with-

out question the foremost American authority on this latter group.

In 1911 he gave up his practice and came to the University as Curator of the herbarium, bringing with him his private collection which even at that time was a most valuable one. Under his supervision the university herbarium has become one of the best in the middle west, and the collection of parasitic fungi one of the best in the United States. Many of the more important collections have been added through private purchases by Dr. Davis.

He now began the publication of his notes on the parasitic fungi of Wisconsin. His Provisional List of the Parasitic Fungi in Wisconsin, issued in 1914, was the most important. It included material from four earlier lists. Nineteen lists have been published and another is now in press. On the day of his death he was at his desk and discussed plans for the completion of his index to the parasitic fungi of Wisconsin. Through the publishing of these

lists the parasitic fungi of Wisconsin are better known than those of any other state.

As curator of the herbarium he came into contact with many students. He was always interested in their work and many will remember him as one who was most willing to help in the solution of their more difficult problems.

Dr. Davis was also keenly interested in other sciences and so we find him during more recent years giving serious attention to the little known virus diseases of plants and animals. Dr. Davis early became associated with scientific groups. He was at one time president of the Wisconsin Medical Society. From 1903 to 1906 he was president of the Wisconsin Academy of Sciences, Arts, and Letters. In 1885 his name appears as a member of the Botanical Club. He was present at the meeting of the American Association for the Advancement of Science in Madison when the Botanical Society of America was organized. He was a charter member of the American Phytopathological

Society, and of the American Society of Taxonomists, and he was affiliated with several other scientific groups.

An ardent and devoted scientist, Dr. Davis from his work here learned to understand both the opportunities and the needs of a great scientific institution. He was always ready and willing to suggest problems in research and many of these problems he supported by financial aid. He saw the need of the more intimate tie-up between the biologist, the physicist, and the chemist and was greatly interested in biological problems related to the field of human disease.

He was enthusiastic in support of all conservation measures, and as early as 1888 we find him a member of a group that appeared before our legislature in an effort to have laws passed to regulate the cutting of timber on state lands. For these splendid traits but not for these alone will his name be long honored here, as he was honored, admired and loved when he was still among us.

JOHN J. DAVIS, 1852-1937

By Edward A. Birge

AM asked to add two items, not yet generally known, to the summary of the life and work of Dr. Davis, so well presented by Professor Allen and Professor Gilbert. The first item relates to his continued and active interest in certain aspects of medicine and the sciences underlying medicine. He closely and eagerly followed all studies connected with cancer and also those which deal with viruses. I believe that most of us—and I must include myself in that number—thought that Dr. Davis had given up any direct concern with medicine and had gone completely over, in his interests as well as in his action, to pure science as found in the fungi. But only last month he sent off a letter to an investigator at Rothamsted, England, suggesting possible explanations for facts

which had there been discovered in their study of viruses; and this letter was only the latest expression of a part of him that was always keenly alive.

The other matter relates to the last will of Dr. Davis. I am permitted to say that he has left his estate in trust for his two children. On the death of either of them, one half of the fund is to go to the University of Wisconsin for the benefit of the Department of Botany; and the remainder will finally go in like manner to the Department of Biology. Thus in the most emphatic way Dr. Davis has shown his interest in the advancement and the continuance of scientific study here in our University.

Dr. Davis visited us last summer at our Laboratory on Trout Lake; he was active as ever and eager as ever in his work on the parasitic fungi. The thought occurred to me that no one would have believed the prediction, if in our youth it had been said that he and I would meet, at our age, at that place, and each

of us engaged in the work that busied us there. My first visit to Trout Lake was made some 45 years ago, when lumbermen were just cutting the great pines near the road between Minocqua and Woodruff. Think of the physical changes since that not remote day, which have made a summer laboratory on Trout Lake not merely a possibility but a matter of course. Think even more of the cultural changes which have made it both possible and natural for us to be working there, each at his own bit of pure science: I trying to ascertain how light behaves when it gets into the lake water, and he finding out what fungi are present on the trees and shrubs of the forest. Thus he was carrying on the work that had busied him for 26 years. May we not take a few minutes to consider the significance of that fact?

I suppose that very few men can have had the intellectual history which Dr. Davis enjoyed—in the most complete sense of that word. Until the age of sixty his time and en-

ergy were devoted to the profession of medicine, that profession which, with its attendant sciences, has the greatest amount of "human interest". His life was given to medicine fully, but not wholly, for fungi interested him and claimed his scanty leisure for many years before he came to us. But 26 years ago he became a member of the University and so for more than a quarter century of his life has been given to the purely intellectual side of science. He had little interest in the economic relations of his fungi and gave little thought to them. He asked what fungi are and how they live, and he did not worry over the economic aspects of their existence.

This mental attitude of Dr. Davis is the more noteworthy since he was very completely a product of public education, which is supposed to be especially concerned with "practical results". I have been so long associated with public education that I think of myself as one of its products; but Dr. Davis was such a

product in a far more complete and deeper meaning of the word. He was born into a pioneer community; he grew up in such a community and he graduated with the first class of the newly founded University of Illinois. The organization of that University, like the reorganization of our own institution, was the outcome of that growth of national consciousness which followed the Civil War and which so profoundly affected the social development of the Middle West.

How did it happen that this awakened consciousness took the form of higher education? No doubt many and various forces cooperated, but central among them I should place a motive that has been central in mankind for long ages. It is hard to find a name for it; *instinct* is too animal and too unconscious; *belief* is too intellectual and too conscious; *faith* carries us over at once to creeds, and this far antedates formal creeds. But perhaps *faith* must serve us in want of a better word.

But even though we do not find it easy to classify this faith, its content was never better stated than by a Greek poet some 2200 years ago, when Aratus wrote the introduction to his poem on astronomy, the *Phaenomena*. As custom demanded, he invoked the Gods and especially Zeus, and said that we men, the human race, are of the stock of God. May we not restate his meaning in our own terms? Aratus meant that men belong in some natural way to the intellectual side of the universe; not geniuses only, but ordinary men, like his readers; like you and me, for the matter of that. One can write poems for us and we can read them. We understand things, up to a certain point, as Zeus did, and we belong in his class. The word that Aratus uses is one to which we biologists can not object; for it is our own special word *genus*. Aratus put men into the genus God, so far as knowledge goes; he could not have gone further when he was dealing with astronomical phenomena. No doubt he

would have been prompt to include power as well as knowledge in this relationship; but it is this side of knowledge that the life of Dr. Davis so well sets forth.

Aratus threw out this idea as a matter of course, and in that fact lies its significance. He was content to state in a single phrase, in a single word, a faith which went back into the unknown past of his race; a faith that somehow, in some way, we human beings are not merely part of creation, we also belong to the creative side of the world. By our very natures we have a right to knowledge and to power. And this faith, spoken or unspoken, was no peculiar possession of the Greek race or of any other. About the time that Aratus was writing, the remoter ancestors of Dr. Davis were feeling crowded and uneasy somewhere in Asia; perhaps they were already beginning to move west. Perhaps they had started on that journey which in a millennium or so carried them into central and western Europe, and which

was finally completed for Dr. Davis when his people moved west from New York and Pennsylvania to Illinois.

Throughout this journey, long both in space and in time, these people carried their faith with them. It took all sorts of forms; it found all sorts of expressions, which we may call good or bad, or both, according as time and circumstances may have shaped us. I speak of only one of these multiform manifestations; that which gave Dr. Davis the University of Illinois as his Alma Mater.

How did it happen that Illinois gave to its first graduates the kind of teaching that finally led Dr. Davis to his work on fungi? The University taught them how to meet the practical problems of a young society; it gave them the training which guided Dr. Davis into medicine. There was also something more; there was that for which we remember him who worked with him. The University somehow got into him that central article in the creed of "a doc-

tor's religion": "Every man truly lives so long as he acts his nature, or somehow makes good the faculties of himself".

I do not know and, to speak frankly, I do not care, whether Dr. Davis ever used these words, which came so naturally from his colleague of an older generation. But we all know that at Illinois he caught the vision of pure science, of science not merely the servant of men, but the expression of human thought, the outcome of human nature. This faith was wrought out in his life rather than proclaimed in his talk. It was the essence of his quarter century of work with us.

You who are younger may wonder that these pioneer universities should have nourished this love of knowledge for its own sake; but that side of their life seems wholly natural to us who are older. It has been my good fortune to talk over education with hundreds of parents, with scores of legislators. They did not put their faith into words, not being poets even of

the grade of Aratus. But in the hopes of fathers and mothers for their children, better shown by looks than by words; in the vague determination of legislators that their state should have a "real university", there has always been incarnate the faith which the poet put into a word and which Dr. Davis put into his work.

Let me come back to that work for a closing word. If we human beings belong to the creative side of the universe, education must not merely guide the flow of our thoughts and aspirations into prearranged channels. Higher education must do more than "meet the needs of society"; it must at least hint at the infinite variety of freedom. The society which it helps to shape must be one into which the life and work of Dr. Davis shall naturally fit. And education must do more, it must inspire such men to "make good their faculties" with the freedom that Dr. Davis found for himself and showed to us; the freedom which his latest act has helped to perpetuate among us after he has left us.





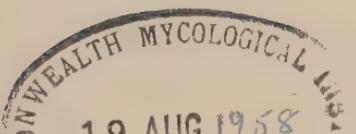
NOTES ON PARASITIC FUNGI IN WISCONSIN.

III

J. J. DAVIS.

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XVIII, PART I.

Issued October, 1915.



NOTES ON PARASITIC FUNGI IN WISCONSIN—I.

J. J. DAVIS.

These notes are intended to be supplementary to "A provisional List of Parasitic Fungi in Wisconsin" published in Transactions of the Wisconsin Academy of Sciences, Arts and Letters. Vol. XVII, pt. 2, pp. 846-984.

Plasmopara humuli Miyabe & Takahashi. This was collected on wild *Humulus Lupulus* growing along the river bank at Racine in 1909-10 since which time the station has not been visited. The following notes of this fungus were made at Racine: Spots small, angular at first, limited by the veinlets, brown-red or purplish above, below of a darker green than the leaf, giving the "water soaked" appearance. The spots are surrounded by an indeterminate yellowish discoloration especially early in the season, less marked as the leaves become firmer, and finally assume the lethal brown with the death of the tissues included. Conidiphores hypophylloous, grey, $175-325 \times 5-6 \frac{1}{2} \mu$ with usually two lateral branches each of which is about equal in development to the terminal portion and 1-3 times branched, ultimate branchlets tapering, subacute; conidia fuligineous tinted, elliptical, somewhat acute at each end, furnished with an apical papilla of dehiscence, $20-33 \times 12-17 \mu$, usually about $26 \times 15 \mu$; oospores scattered in the leaves; oogonia irregularly thickened, brown, subglobose, $36-40 \mu$ long, oospores filling the oogonia $30-33 \mu$ long.

Asterina plantaginis Ellis. This is referred to *Mycosphaerella* by Theissen (*Ann. Mycol.* 10:2:196. (Apr. 1912).

Asterina rubicola Ell. & Evht. This is described by Theissen in the same communication (p. 195) but no new combination is proposed.

Gnomoniella fimbriata (Pers.) Sacc. This was inserted in the provisional list because of an immature specimen in the herbarium of the University of Wisconsin which is perhaps of this species. It was collected at Osceola by E. Sheldon in 1892.

Phyllosticta destruens Desm. In writing the provisional list I followed Ellis & Everhart (*North American Phyllostictas*, 40) in referring to this species specimens on *Prunus virginiana* and also on *Amelanchier*. The former has been described under the name *Phoma virginiana* Ell. & Hals. (*Journ. Mycol.* 4:8. (1888)) the latter as *Phyllosticta innumerabilis* Pk. (*Bull. Torr. Bot. Club.* 36:336 (1909)). Specimens on *Amelanchier* were distributed under the name *Phyllosticta destructens* Desm. in *Fungi Columbiani continued* 1447. I have seen no European specimens of *Ph. destruens* Desm. which is said to occur on *Celtis* as well as *Prunus* and to have epiphyllous pycnidia, but I infer that Mr. Ellis had good reason for using that name. Before the list was printed I removed *Amelanchier* as a host of *Phyllosticta destruens* Desm. with the intention of inserting *Ph. innumerabilis* Pk. an intention which I failed to carry out, so that *Amelanchier* as bearing the *Phyllosticta* appears only in the host index. Morphologically I see no distinction between the fungi on the two hosts.

In the provisional list of parasitic fungi in Wisconsin Patouillard is given as the author of the binominal *Protomyces andinus* as is done in the *Sylloge Fungorum*. An examination of Patouillard's paper however shows that it was published as *Protomyces andinus* Lagh. sp. nov. Lagerheim, not Spegazzini, collected the type material in Ecuador, not Chili.

Phyllosticta mulgedii Davis, a name that was proposed in the 4th supplementary list (No. 709), was omitted from the provisional list. The fungus has not been collected again and is probably one of the *Phomae* that have been described as occurring on the leaves of *Compositae*.

Phyllosticta desmodii Ell. & Evht. This was described (*Journ. Mycol.* 5: 146: 1889) from a single small collection in Walworth Co. Much better material has been collected at Madison on *Desmodium canescens*. The pycnidia are epiphyllous, brown, sub-spherical, 125–160 μ in diameter; sporules oblong, often somewhat

narrower in the middle, ends rounded, conspicuously 2-4 guttulate, $6-12 \times 3\mu$. The appearance of the sporules suggests that later they may become septate.

Phyllosticta cruenta (Fr.) Kickx. The reference of this species to *Macrophoma* as proposed by Ferraris (*Ann. Mycol.* 10:3:288 (Jn. 1912)) would make a generic distinction between the two forms that were given as varieties in the provisional list because the globose sporules of *Ph. pallidior* Pk. are only about 10μ in length, although they equal in content the longer and narrower sporules of the type of *Ph. discincta*.

Ascochyta pisi Lib. has been shown by R. E. Stone to be a conidial form of *Mycosphaerella pinodes* (Berk. & Blox.) Niessl (*Ann. Mycol.* 10:564 *et seq.* (Dec. 1912)). Also R. E. Vaughan, *Phytopathology* 3:71 [1913].

Actinonema rosae, (Lib.) Fr. Diedicke calls this *Marssonina rosae* (Lib.) Trail (*Ann. Mycol.* 10:146 (Apr. 1912)). F. A. Wolf has developed the ascosporous stage which he refers to the *Microthyriaceae* and makes the type of a new genus and calls it *Diplocarpon rosae* F. A. Wolf. (*Bot. Gaz.* 54, 231 (Sept. 1912)).

Septoria nubilosa Ell. & Evht. (*Proc. Acad. Nat. Sci. Phil.* 1891, p. 76) which was founded on Wisconsin material on *Heleinum autumnale* has not been included in the Wisconsin lists because it is merely a form of *Septoria helenii* Ell. & Evht. in which the spots are not well developed. The type was collected on the north side of plants bearing typical *S. helenii* and was sent to the authors merely to show the variation.

Septoria ribis Desm. Some of the specimens that I have referred to this species are perhaps *S. grossulariae* var. *longispora* Ferraris (*Ann. Mycol.* 10:291). Typical *S. grossulariae* (Lib.) West. I have collected but once.

Septoria saccharina Ell. & Evht. Specimens from Price Co. bear sporules about $30 \times 2\frac{1}{2}\mu$. The *Acer*-inhabiting fungi, having triseptate sporules borne in acervuli and varying in length from $20-70\mu$ and in width from $1\frac{1}{2}-5\mu$ seem to me to constitute a group the relation of the members of which can be determined by inoculation methods only. The form with short and thick sporules has been called *Ascochyta aceris* Lib. and later

Phleospora aceris (Lib.) Sacc. and with this have been included narrower spored forms but usually the latter have been referred to *Septoria*. Diedicke has recently referred the European forms with sporules 3 μ or less in thickness to *Cylindrosporium*, recognizing three species. (*Ann. Mycol.* 10: 486 (Oct. 1912)). *Septoria saccharina* E. & E., however, while producing similar sporules develops pycnidia in definite arid spots but *Cylindrosporium saccharinum* Ell. & Ev. agrees with the form on *Acer rubrum* which was recorded in the "provisional list" under the name *Phleospora aceris* (Lib.) Sacc.

Septoria musiva Pk. The specimens of *Septoria* that have been collected on *Populus* in Wisconsin may be divided into groups as follows:

1. Spots subcircular to subangular, black becoming white and arid except the peripheral portion, 3-5 mm. in diameter; pycnidia epiphyllous, superficial-collapsing, hemispherical in section, about 100 μ in diameter; sporules cylindrical, curved, obtuse, 3(2-4) septate, 25-60 x 2-3 μ . On *Populus balsamifera*.
2. Similar to the above except that the central portion of the spot becomes alutaceous or cinereous instead of white and the pycnidia are more scattered and lie deeper. Also on *P. balsamifera*.
3. Spots subcircular to angular, limited by the veinlets, at first brown, becoming grey by the loosening of the cuticle, 1-3 mm. in diameter, becoming confluent into larger areas, 1/2-1 cm. in diameter; pycnidia innate, discharging on either surface but usually below, having a thin but distinct wall and a large opening, 70-100 μ in diameter; sporules cylindrical, curved, obtuse, 3(2-4)-septate, 25-65 x 2-3 μ . On *Populus deltoides*.
4. Spots roundish to irregular and angular, dark brown above becoming grey with age, light brown below, 2-5 mm. in diameter, often confluent; pycnidia hypophyllous, punctiform; sporules cylindrical, curved, obtuse, 3-5 septate, 45-65 x 3 μ . On *P. balsamifera*.
5. Spots angular, blackish brown above, paler below, becoming lighter and mottled with age, 1/2-1 cm. in diameter; pycnidia scattered, innate, thin walled; sporules filiform, narrowed to one end, 3-6 septate, 40-70 x 1 1/2-2 1/2 μ . On *Populus tremuloides*.

In the provisional list all of these forms were included in *Septoria musiva* Pk., although group 5 may prove to be distinct, but

one can hardly decide that on morphological grounds without an abundance of material. I find this in Wisconsin only to the north and with few pycnidia. Much the best specimens that I have seen were collected at North Yakima, Wash. (Wis. Acad. Sci. Arts & Lett. 15:778).

In Farlow's Host Index, *Populus balsamifera* is given as a host of *Septoria salicina* Pk. I presume that this refers to what I have called group 1. This form looks quite distinct but it merges into group 2 and that again into group 3 in a way that makes it difficult to draw a line of separation, while the characters of the sporules are identical. *Septoria salicina* Pk. differs in its uniseptate sporules. Of *Septoria populi* Desm., which has uniseptate sporules, I have seen no American specimens. *Fungi Columbiani* 2873, issued under this name seems to be the same as 2872 which is labeled *Septoria musiva* Pk. On neither have I found a *Septoria*. I may mention that *F. Col. 1587* on *Populus tremuloides* collected by J. B. Ellis at Newfield, N. J. and issued as *S. musiva* Pk. bears *Marssonina rhabdospora* (E. & E.) Magn. at least in the two copies which I have seen. *F. Col. 3486* on *Populus balsamifera* collected at St. Johnsbury, Vt. by W. P. Carr and issued as *Septoria populi* Desm. is of the form with black bordered alutaceous spots that I have placed in group 2. *Pacific Slope Fungi* 1723 on *Populus Fremonti* collected in California by Copeland and issued by Baker as *Septoria populi* Desm. is somewhat intermediate between groups 2 and 3. *Fungi Columbiani* 1257 on *Populus angustifolia* collected at Golden, Colorado, by Bethel, and issued as *Septoria populi* Desm. has subcircular spots of a yellowish white or sordid white color with an irregular grey-brown border 2-4 mm. in diameter; the pycnidia are hypophyllous, broad and collapsing; the sporules continuous 23-35 x $3\frac{1}{2}$ -4 μ . While this does not correspond with *S. populi* Desm. it is different from any *Septoria* on *Populus* that I have seen and judging from the single specimen may prove to be distinct. *Cylindrosporium oculatum* Ell. & Evht. on *Populus deltoides* (Put-in-Bay, Ohio) has hemispheric-superficial pycnidia and obtuse sporules 30-50 x 3 μ becoming 3 or more septate. This forms circular grey to sordid spots about $\frac{1}{2}$ cm. in diameter with a narrow dark border. I would include it in *Septoria musiva* Pk. as representing forms 1 and 2 on *Populus deltoides*. Specimens

on this host collected at Ithaca, N. Y., by Higgins (com. Bartholomew) bear both this and form 3 on the same leaves.

After this was written a collection was made from the examination of which the following characters were noted: spots angular-suborbicular, at first brown with a narrow darker margin, then grey and finally mottled with small angular cream colored areas, sometimes confluent, 2-3 mm. in diameter; pycnidia mostly hypophyllous and inconspicuous, $65-75\mu$ in diameter; sporules, hyaline, filiform, acute, 3-6 septate, $38-60 \times 2\frac{1}{2}-3\frac{1}{2}\mu$. On *Populus grandidentata*. Devils Lake, Wisconsin, Aug. 6, 1913.

In this connection a still more recent (Aug. 21, 1914) collection on *Populus deltoides* is of interest. *Phyllosticta populina* Sacc. is said to occur in association with *Septoria populi* Desm. in Europe. Having made a collection of the former at Prescott the associated *Septoria* was examined with some interest. The spots are orbicular, cinereous with a narrow dark margin and resemble those of form 2 except in the grey color which in the older spots changes to white. On some of the leaves are small angular, confluent spots like those of typical *Septoria musiva* Pk. Of the first mount from this material it was noted "sporules mostly $18-22 \times 2-3\mu$, 1-2 septate with occasional longer ones up to 48μ and 3-septate"; of another mount " $30-45 \times 2-3\mu$, 2-3 septate". This seems to connect with the forms described above and suggests that there is a widely variable species of *Septoria* occurring on *Populus* in both America and Europe. *Septoria candida* (Fckl.?) Sacc. I have not seen, but the description indicates that it might readily fall in with the American forms.

Cercospora geranii Kell. & Sw. Of a specimen collected at Blue Mounds the following notes were made. Hyphae usually straight, slightly colored, often toothed, $25-75 \times 6-7\mu$; conidia hyaline, cylindrical, usually more or less curved, obtuse, becoming pluriseptate, $100-165 \times 4-5\mu$.

Cercospora subsanguinea Ell. & Evht. is sometimes devoid of color and the obtuse conidia sometimes divide in the middle. It appears to be more nearly a *Ramularia*.

Gloeosporium fragariae (Lib.) Mont. My notes of the measurements of the sporules of the fungus referred to this species range from $12-24 \times 4-5\mu$. It was collected at Spooner.

Gloeosporium ribis (Lib.) Mont. & Desm. As it occurs in Wisconsin this usually has the characters of the forma *ribis nigri americana* Sacc. The sporules sometimes reach 30μ in length.

Gloeosporium tremuloides Ell. & Evht. 2nd suppl. list no. 526 was omitted from the provisional list because of the belief that the species was founded on imperfectly developed material of *Marssonina castagnei* (D. & M.) Magn. which occurs in atypical forms in Wisconsin. Oudemans proposed the variety *moniliferae* in which the acervuli are amphigenous although more abundant above. In Wisconsin they are often hypophylloous only and the sporules are often but $12-15\mu$ long. *Marssonina brunnea* (E. & E.) has been omitted, being considered, perhaps erroneously, a form of *M. castagnei*.

Ramularia plantaginis Ell. & Mart. In the description of this species the spots are said to be minute. Specimens on *Plantago Rugelii* collected at Madison in September have spots up to 3 cm. in diameter. Conidia appear also on the ealyces.

Ramularia alismatis Fautrey. This was reported in the third supplementary list under the name *Ascochyta alismatis* (Oud.) Trail. Dr. R. A. Harper has kindly compared Wisconsin material with the type of *Ascochyta alismatis* Ell. & Evht. in the Ellis herbarium and finds them to be the same. The very short undifferentiated conidia-bearing hyphae makes this an atypical *Ramularia*. It is not unlikely that *Septoria alismatis* Oud. is of the same character. The spots usually have a slight eminence in the center as if a pyrenidium lay beneath. (See Diedicke, *Ann. Mycol.* 10:479).

Ramularia uredinis (Voss) Sacc. This is the fungus recorded in the supplementary and 3rd suppl. lists no. 330 under the name *Fusarium uredinum* E. & E. The tufts are sometimes pink or even testaceous. My measurements of the conidia, which are in branched chains, are from $7-17 \times 3-4\mu$.

Ustilago osmundae Pk. This has been collected on *Osmunda regalis* in Washburn and Burnett counties. I have not been able to follow the author of the species in his reference of it to *Mycosyrix*. (New York State Museum; Report of the Botanist 1911, p. 43). When the fungus is present each frond arising from the rhizome bears the smut or else is sterile.

Ustilago lorentziana Thuem. which occurs at Madison on *Hordeum jubatum* and which was recorded in the 4th supplementary list seems to have been omitted from the provisional list.

Entyloma linariae Schroet. var. *veronicae* Wint. The newly formed spores of this smut were found to germinate readily in May but to gradually lose the power as the season progressed as had been found to be the case with *E. floerkeae* Holw. (2nd suppl. list, No. 487). The promycelial spores are usually two (1-4) in number, 15-20 x 3 μ .

Material wintered outdoors (May to May) germinated the following spring in the same manner.

ADDITIONAL HOSTS.

Synchytrium aureum Schroet.

In September, 1912, this was found at Millston, Jackson county on *Lycopus virginicus*, *Lysimachia terrestris* and leaves of blackberries that I have referred to *Rubus hispida* and *Rubus villosus*. The infection was sufficient to indicate that each of these plants are normal hosts of the organism in that locality, *Rubus villosus* being least affected. No success attended special efforts to find other hosts. In 1913 it was collected at Athelstane, Marinette Co., on *Rubus hispida* but on no other host. In 1892 *Synchytrium* occurred rather abundantly in a bit of woodland near Berryville on *Viola pubescens* and *Geum canadense* and during the same season it was collected at Somers, but a few miles distant, on *Ranunculus recurvatus*. The infection of the latter was limited and I have not seen it since on this host. It was collected again at Berryville in 1894 soon after which the station was cleared and put under cultivation. In 1902 a collection on *Viola pubescens* was made at the Somers station. In 1907 considerable infection of the same host was observed at a station intermediate between the other two and during the same season very limited infection of *Prenanthes alba* at this station and of *Pedicularis canadensis* near Racine was observed. The infection of the two latter hosts appeared to be accidental and temporary, the organism failing to get a permanent foothold. At Millston some of the affected leaves of *Lycopus* bore considerable hypertrophies often surrounded by purple discoloration but usually there was little dis-

tortion of the hosts, even when the sori were numerous and aggregated, the pressure being into the mesophyl which was sometimes torn from the epidermis in the area surrounding the gall.

The common factors which make for susceptibility in these various hosts are not apparent to me.

Septoria astericola Ell. & Evht. on *Aster puniceus*. In the specimen on this host the spots become lead color with a dark border. The largest spots are 1 cm. long. The pycnidia are epiphyllous, about 80μ in diameter and the sporules $23-33 \times 1\mu$. Collected at Lake Mills, Oct. 19, 1912.

Gloeosporium saccharinum, Ell. & Evht. Specimens on *Acer spicatum* collected at Spooner have circular spots of a pale olive color with a darker border; the largest sporules are $7 \times 3\mu$. The fungus often develops on subcircular spots of a tan color on *Acer Saccharum*.

Cercospora caricina Ell. & Dearn. My notes of a specimen on *Cyperus filiculmis* collected at Madison, Aug. 12, 1912, are as follows: Hyphae 3-8 in a tuft, brown, somewhat nodulose, often denticulate at the apex, $50-80 \times 3-4\mu$; conidia hyaline, obclavate-cylindrical, straight or curved, becoming pluriseptate, $65-100 \times 3-4\mu$. On bracts and culms, spreading from above downward. *Cercospora caricina* Ell. & Dearn. is described as having hyphae $15-25 \times 3-3\frac{1}{2}\mu$ and conidia $34-73 \times 3\mu$, but I have specimens on *Carex* in which the hyphae and conidia equal those noted on *Cyperus*. *Cyperus Houghtonii* which was tentatively given as a host in the 4th suppl. list should not have been omitted from the provisional list.

Cercospora ceanothi Kell. & Swingle. On *Ceanothus americanus*. Madison. In one of the collections on this host the fungus is particularly well developed, the conidiophores being $20-45 \times 4-5\mu$ and the attenuate conidia $80-150 \times 4-6\mu$. A collection made in the same locality two weeks later agrees with the description of *Cercospora fuliginosa*, E. & E. the conidia being darker, cylindrical and 30-80 long. It is probable, therefore, that the descriptions of *C. ceanothi* Kell. & Swingle and *C. fuliginosa* Ell. & Evht. were drawn from different states of the same fungus. The former is the prior name and the latter is antedated by *C. fuliginosa* Ell. & Kell. on *Diospyros* (1887) for which reason *C. MacClatchieana* Sacc. & Syd. was substituted.

ADDITIONAL SPECIES.

Leptosphaeria folliculata Ell. & Evht. var. *OXYSPORA* n. var. On *Carex gracillima*. Price Co. Sept. 9, 1911. Differs from the type in the somewhat narrower ascii (ca. 50x8 μ) and especially in the triseptate acute ascospores (ca. 15x3 μ). On the comparatively narrow leaves of this host the perithecia are borne on dead apical areas at the bases of which there is often evidence of primary spotting and confluence. I am indebted to Dr. R. A. Harper for comparison of this with the type in the Ellis herbarium at the New York Botanical Garden. It is not unlikely that sufficient material would connect these forms with *L. caricicola* Fautr. and *L. caricina* Schroet.

Phyllosticta livida Ell. & Evht. On *Quercus macrocarpa*, Millston, Jackson Co. In these specimens the pycnidia are hypophyllous. If they really represent this species the fungus has a wide distribution in the U. S. previous collections being reported from California and Florida.

PHYLLOSTICTA LIATRIDIS n. sp. Spots round, white or sordid, arid, 1-2 mm. in diameter, usually surrounded by a broad black border; pycnidia epiphyllous, prominent, black, about 65 μ ; sporules hyaline, oblong, 2-4 nucleolate, about 10x4 μ . On *Liatris spicata*, Gaslyn, Burnett Co. Aug. 1, 1911. This can hardly be *Phoma minutissima* Cke. as that species is described.

DIPLODIA UVULARIAE n. sp. Spots oval to orbicular, white, thin and arid, usually with a ferruginous border, 8-15x5-10mm.; pycnidia mostly epiphyllous, scattered, black, globose, 100-150 μ ; sporules elliptical to ovate, brown, uniseptate, 12-20x6-7 μ . On *Uvularia (Oakesia) sessilifolia* Spooner, Aug. 15, 1911 (type) and Gaslyn. What is probably imperfect material of this species has been collected at Blue Mounds on *Uvularia grandiflora*. It is not unlikely that *North Am. Fungi* 2153 issued under the *nomen nudum* *Phyllosticta uvulariae* Galloway is of this character. (See 4th suppl. list under No. 359.) Macroscopically this fungus suggests *Phyllosticta cruenta* (Fr.) Kx. Occasional biseptate sporules occur as is to be expected.

Stagonospora intermixta (Cke.) Sacc. Price Co., Oct. 9, 1911. On leaves of *Cinna arundinacea*. I have not seen an

authentic specimen of this species. The specimens which I have referred here have depressed-globose pycnidia $40-60\mu$ in diameter with a round apical pore which is surrounded by a thick black ring. The long-fusoid sporules are 7—septate, $40-60 \times 3\frac{1}{2}-5\mu$.

SEPTORIA ANDROPOGONIS, n. sp. Causing narrow elongated areas of a reddish-yellow color sometimes becoming sordid; pycnidia epiphyllous, subseriate or scattered, dark brown, depressed globose, little prominent, $75-100\mu$; sporules hyaline, straight or slightly curved, more acute at one end, becoming 2-4 septate, $30-50 \times 2-3\mu$. On leaves of *Andropogon furcatus*, Gaslyn, Burnett Co. July 31, 1911.

SEPTORIA POLITA n. sp. Pycnidia scattered, globose, innate, black, ostiolate, $65-100\mu$; sporules hyaline, straight or somewhat curved, truncate to obtusely rounded at each end, becoming 3-5 septate, $35-50 \times 2\frac{1}{2}-3\mu$. On *Carex sp. indet. (stellulata?)* Gaslyn, Wisconsin, Aug. 4, 1911. This attacks the distal portion of the very narrow leaves of the host which becomes sere. The sporules have a very smooth or polished appearance and are not at all constricted at the septa.

SEPTORIA CARPINEA (Schw.?) n. comb. Spots subcircular to angular, numerous, reddish brown becoming sordid in the center, somewhat paler below, 1-5 mm. in diameter; pycnidia epiphyllous, few, scattered, prominent, black, globose, ostiolate, about 65μ ; sporules hyaline, usually curved, frequently arcuate, pluriguttulate, $25-40 \times 2-3\mu$. On *Carpinus caroliniana*, Gaslyn, Wisconsin, Aug. 8, 1911. It seems quite possible that this is the fungus called *Xyloma* by Schweinitz and *Depazea* by Fries.

Septoria Polymniae Ell. & Evht. The specimens on *Polymnia canadensis*, collected near Somers in 1903, which I hesitatingly refer to this species show suborbicular spots $\frac{1}{2}-1$ cm. in diameter which become brown above, darker toward the margin. The pycnidia correspond with those of this species. My notes of the size of the sporules read $40-45 \times 1\frac{1}{2}-2\mu$.

SACIDIUM MICROSPERMUM (Pk.) n. comb. (*Septoria microsperma* Pk.) On fallen leaf of *Betula alba papyrifera*. Butternut, Oct. 8, 1911. Hypophyllous on indefinite brown areas which show a tendency to extend along the veins; basidia and

sporules in a discoid layer 100–150 μ broad which is covered by a chitinoid, punctulate clypeus which becomes irregularly fissured; sporules straight or allantoid, 6–10 x $3\frac{1}{4}$ –1 $\frac{1}{2}$ μ . *North American Fungi* 674 on *Betula lenta*, collected by Nuttall in West Virginia, shows faded leaves with circular green areas. The pycnidia, however, are by no means confined to the green spots. In the West Virginia specimens also the sporules are smaller than in the type as described. I assume that it represents it in its *Sacidium* structure. Perhaps this is not distinct from *Leptothyrium betulae* Fckl.

(This has since been collected on the same host at Wausauke.)

A *Gloeosporium* which has appeared in the greenhouse of the botanical department at Madison on the leaves of *Dendrobium moschatum* causes orbicular arid spots about 1 cm. in diameter with a dark purple border and elevated margin. The acervuli are brown, scattered, mostly epiphyllous; the sporules oblong to ovate-oblong, obtuse at both ends, biguttulate, 10–15x4 μ . Probably this is *Gloeosporium cinctum* B. & C. and perhaps also *Gl. pallidum* Karst. & Har. The studies of Shear and Wood, however indicate that it is a conidial condition of *Glomerella cingulata* (Stonem.) S. & V. S. (U. S. Dept. of Agr., B. P. I., Bull. 252).

COLLETOTRICHUM HELIANTHI n. sp. Spots definite, orbicular, olivaceous with a cinereous center and a black margin, paler below, often confluent, 3–5 mm. in diameter; acervuli very prominent, one or few on a spot, 50–65 μ broad, surrounded by black rigid bristles 80–150x3–5 μ which taper from base to apex; sporules hyaline, fusiform to arcuate, nucleolate, acute at each end, 25–35x2 $\frac{1}{2}$ –3 $\frac{1}{2}$ μ . On *Helianthus sp. indet.* Madison, Wisconsin, July 7, 1907. This is allied to *C. solitarium* Ell. & Barth. from which it differs in the larger bristles and sporules. I found the specimen in the herbarium of the University of Wisconsin with the name of the collector not given

Ovularia asperifoliae Sacc., var. *LAPPULAE* n. var. Spots suborbicular, dark brown, $\frac{1}{2}$ –1 cm; conidiophores hypophyllous, scattered or in tufts of 2–4, hyaline, often toothed, usually 16–20x3–4 μ ; conidia in chains which are sometimes branched, hyaline, 6–18x3–4 μ ; the lower conidia are cylindrical, acute at each end, 12–18x3–3 $\frac{1}{2}$ μ , the upper fusoid, 6–12x3–3 $\frac{1}{2}$ μ . Much

longer hyphae (*ca.* 50 μ) have been observed bearing conidia singly and laterally. On *Lappula virginiana*. Somers, Racine and Blue Mounds. While this fungus causes conspicuous spotting of the leaves the conidia are inconspicuous and evanescent. I have had it under observation for a number of years expecting at some time to secure specimens with a more profuse development of conidia. A specimen collected at Blue Mounds, July 13, 1912, is taken as the type. A more recent collection made at Potosi bears conidia up to 30 μ in length. The Wisconsin fungus seems to be closely allied to var. *symphytuberosi*, Allesch. (*Hedwigia*, 1894, p. 73.) These specimens differ from *Hermodendron farinosum* Bon. as figured (Bot. Zeit., t. VIII, fig. 9) in the longer and narrower conidia and the absence of the two guttulae in the lower members of the chain.

During August and September, 1912, there was collected at Madison on leaves of *Ribes americanum* a fungus of which the following notes were made: "Spots angular, limited by the veinlets, often confluent into irregular areas, brown, 2-5 mm. in diameter; conidiophores hypophyllous in scattered tufts, closely fasciculate from a prominent sclerotoid base, hyaline, often toothed, 30-65x2-3 μ ; conidia terminal and lateral, hyaline, cylindrical, abruptly acute or rounded at each end, occasionally with a median septum, 20-50x3-4 μ . The tufts usually have more or less of a pink tinge. Large fasciculi have a marked stilboid appearance." Leaves bearing the fungus were wintered out of doors and the following May were found to bear heads of conidia up to 250 μ or more in diameter of a vinous purple color with the conidiophores compacted into blackish stipes *usque* 150 μ high each springing from the summit of a plectenchymatous pseudopycnidium. The conidia borne on these heads were hyaline, catenulate, fusoid, continuous, 10-18x3-4 μ . With these were fasciculi, snow white to purplish, of the mucedine type and occasional broader ones more tubercularoid in appearance.

Accepting the coreium structure as the climax development of this fungus I have labeled the specimens *GRAPHIOTHECIUM VINOSUM* n. sp. and as it appears to be at least a facultative parasite have given it a place in this list.

Ramularia calthae Lindr. Specimens having the following characters have been referred to this species. Spots small,

angular, immarginate, limited by the veinlets, becoming confluent, brown, more abundant near the margin of the leaf; conidio-phores epiphyllous, tufted from a stromatoid base, erect, simple, hyaline, $15-30 \times 1\frac{1}{2}-2\mu$; conidia similar, sometimes catenulate $12-24 \times 1-1\frac{1}{2}\mu$. On *Caltha palustris*. Gaslyn, Burnett Co., Aug. 30, 1911.

CERCOSPORELLA EXILIS n. sp. Spots round to angular, limited by the veinlets, often confluent, brown, 2-5 mm.; conidio-phores in small loose tufts which are effused over the lower surface of the spots, hyaline, continuous, usually subulate, nearly straight, seldom branched, $10-20 \times 2\frac{1}{2}-3\frac{1}{2}\mu$; conidia cylindrical, straight, hyaline, continuous or obscurely septate, $20-40 \times 1-2\mu$. On *Phryma Leptostachya*. Madison, Blue Mounds and Devils Lake, August and September.

Cladosporium paeoniae Pass. On *Paeonia* (cult.) Madison. Pending an investigation of the diseases of paeonies in the United States, which I am informed, is to be made, I use this name provisionally.

Cladosporium gloeosporioides Atk. On *Hypericum virginicum*. Grand Rapids (Peltier) and Madison. This forms definite alutaceous spots on the leaves. When, however, the host plants are in a thick overshadowing growth of *Carices* and other taller plants the hyphae are borne on indefinite discolored areas. Frequently all gradations may be seen on a single host; on the upper leaves, exposed to the sunlight, the hyphae being confined to definite tan colored spots while on the lower they are borne on indefinite subolivaceous areas. I find the length of the hyphae variable; in some specimens $20-30\mu$, in others *ca.* 60μ . Dr. R. A. Harper has kindly compared this with specimens of *Gloeosporium cladosporioides* Ell. & Hals. in the Ellis Herbarium and transcribed the following notes from the inside of one of the envelopes; "Hyphae $35-40 \times 4\mu$, fasciculate, nodulose above, hyaline becoming dark; conidia oblong-elliptical $10-14 \times 4-6$ microns". Dr. Harper writes:

"The spores seem like those on your material but the fungus on Halsted's material seems to be almost if not entirely on the stem. His host plant, of course, has narrow leaves quite different from yours. I did not get a good preparation of the conidio-phores; I should think the two might be the same but I am

doubtful. The New Jersey fungus is certainly not as conspicuous as yours and produces no such leaf spots."

Considering the differences in the hosts it seems to me that there is a variable *Cladosporium* on *Hypericum* to forms of which these two names were applied. If that is the case I would prefer the later name here used to avoid tautology.

CERCOSPORA FINGENS n. sp. Spots suborbicular, immarginate, blackish brown, 3-5 mm.; conidiophores hypophylloous, olivaceous brown, somewhat crooked, denticulate, thicker and paler toward the apex, pluriseptate, $130-250 \times 4-6 \mu$; conidia hyaline, pluriseptate with a tendency to break apart at the septa, somewhat flaccid, tapering upward, $100-215 \times 3-5 \mu$. On *Thalictrum dasycarpum*, Burnett, Washburn and Price Counties, July-September. On *Thalictrum dioicum*, Lone Rock, (R. A. Harper and G. M. Reed). Because of the long and slender hyphae and conidia this resembles, under a hand lens, *Phytophthora thalictri* Wils. & Davis for which it was mistaken in the field.

I was at first disposed to refer this to *Cercospora aquilegiae* Kell. & Sw. but as no specimens have been collected on *Aquilegia* in Wisconsin, I infer that it is distinct.

Puccinia microsora Koern. Amphi- and teleuto-spores on *Carex Tuckermani* Price County and *Carex scabrata*, Bayfield.

Coleosporium sonchi-arvensis (Pers.) Lev. II, III, on *Sonchus asper*, I on *Pinus sylvestris*, Sturgeon Bay. The uredinia were collected by Mr. J. G. Sanders, Entomologist of the Wisconsin Agricultural Experiment Station, who found it to be locally abundant. The aecia usually appear upon but one of the paired leaves.

Herbarium of the University of Wisconsin, Madison Wisconsin, March, 1913.

NOTES ON PARASITIC FUNGI IN WISCONSIN—II.

J. J. DAVIS.

This communication holds a supplementary relation to *A provisional List of parasitic Fungi in Wisconsin* which was presented to the Wisconsin Academy of Sciences, Arts and Letters in March, 1912, and published in its Transactions, volume XVII pt. 2. After some notes of a miscellaneous character a list is given of hosts and another of species additional to those previously reported for Wisconsin. A communication of similar scope was presented to the Academy in April, 1913, and is published herewith.

University of Wisconsin Herbarium, Madison, Wisconsin,
April, 1914.

Peronospora viciae (Berk.) D. By. In the provisional list a question mark was placed after *Vicia americana* where given as a host of this mildew. The reason for this is that the conidia of the downy mildew collected on this host in Wisconsin are longer than those of *P. viciae* on *Pisum* or on foreign species of *Vicia* as far as I have examined them. All of the specimens on native species of *Vicia* I have seen are similar to those that have been collected on *V. americana* in Wisconsin. The Wisconsin station is near Lake Mills and on the railroad right of way where the mildew may have been introduced from the plains region which seems to be the habitat of this form. Such evidence as I have seen indicates that the American and European forms are physiologically distinct. I would suggest that the native form be distinguished as *Peronospora viciae* var. *americana*—with conidia 30(24-36) x 20(17-26) and that *Fungi Columbiana* 1836 on *Vicia linearis* Stockton, Kansas, Bartholomew, be taken as the type of this variety.

An interrogation point was also placed after *Acalypha virginica* where given as a host of *Peronospora euphorbiae* Fckl. in the provisional list because the quantity collected was insufficient for determination. Further search has been fruitless save for one conidiophore.

Plasmopara ribicola Schroet. The young oöspores of this species that I have seen are few, scattered, globular, smooth, 26–33 μ in diameter. The oögonial wall is often symmetrically thickened on two opposite sides.

Protomyces fuscus Pk. appears to be a race of *Plasmopara pygmaea* (Ung.) Schroet. that produces oöspores abundantly but conidia not at all. I have had this form under observation for a number of years with reference to the appearance of conidia. The similarity of the spores to the oöspores of *Plasmopara pygmaea* (Ung.) Schroet. and the presence of antheridia indicate the character of the fungus. I label it *Plasmopara pygmaea* var. *fusca* (Pk.) although it loses the character of the genus with the suppression of conidia.

Protomyces andinus Pat. In 1911 this was collected at Butter-nut and Madison on *Bidens* with but few scattered resting spores and no hypertrophy of the host. Examination of fixed material of this kind showed the nuclei to be degenerating. I have not seen it on *Bidens* since although abundant on *Ambrosia*.

Septoria alnifolia Ell. & Evht. A hypophyllus *Septoria* on *Alnus incana* collected at Madison is probably of this species but doubtfully distinct from *S. alni* Sacc.

Septoria dentariae Pk. It is probable that this may properly be referred to *S. sisymbrii* Ellis as was done in the preliminary list. There is no question, however, as to its being the fungus that was later described by Peck under this name. Hennings & Ranojevic have proposed the name *Septoria sisymbrii* for a Servian fungus (Ann. Mycol. 10:390 (1910) which is perhaps not distinct from the American plant, but I have not seen Kab. & Bub. *Fungi Imp. Exs.* 557.

Gloeosporium saccharinum Ell. & Evht. (Proc. Acad. Nat. Sci. Phila. 1891, pp. 82–83) appears to have been founded upon material of an unusual character in which the fungus had run

riot. The form ordinarily seen shows spots of subcircular outline 5–15 mm. in diameter. They are at first pale-olivaceous or reddish brown, become alutaceous, fading with age, the peripheral portion darker. They are sometimes confluent. The tissue of the spots finally disintegrates, becomes ragged and falls away centrifugally. The acervuli appear centrifugally, are epiphyllous, saucer shaped, 80–160 μ in diameter, sometimes confluent.

Juniperus communis depressa was given as a host of *Cercospora sequoiae juniperi* Ell. & Evht. in the 4th supplementary list but was omitted from the provisional list. Additional specimens have been collected at Lake Mills by E. M. Gilbert and the writer.

Puccinia cirsii-lanceolati Schroet. I find in the herbarium aecia of this rust collected at Blue Mounds.

Puccinia rubigo-vera (D C.) Wint. *Secale cereale* seems to have been omitted from the list of hosts of this rust in the provisional list.

Gymnosporangium clavariaeforme (Jacq.) D C. Telia have been collected on *Juniperus communis depressa* at Merrimack and Sullivan. They were abundant at the latter station.

Phragmidium occidentale Arth. In the provisional list aecia and telia were reported. Uredinia have since been collected at Ellison Bay in the northeastern corner of the state. Previous collections were made in the northwestern portion.

Melampsoropsis ledicola (Pk.) Arth. Telia of this species were collected at the same time as those of the following. The uredinia have not yet been collected in Wisconsin. The record "I" in the provisional list was founded on a single collection of *Peridermium decolorans* Pk. in Vilas county.

Melampsoropsis ledi (Lk.) Arth. Germinating telia were collected at Sturgeon Bay June 24th, 1913.

Melampsoropsis chiogenis (Diet.) Arth. In *N. A. Flora* the type locality of this rust is given as "Forest City" which should read Forest county. The station is now included in Oneida county.

Pucciniastrum myrtilli (Schum.) Arth. Specimens bearing telia were collected at Athelstane. The teliospores were more abundant in the epidermal cells of the upper surface of the leaves. Fraser (*Mycologia* 5:237, 6:27) finds that the aecia are borne on the leaves of *Tsuga canadensis*. The *Peridermium peckii* of the provisional list probably belongs to this species.

The *Aecidium* sp. *indet.* on *Amphicarpa monoica* of the provisional list is *Aecidium falcatae* Arth.

Senecio aureus was unintentionally omitted from the enumeration of hosts of "*Aecidium compositarum*" in the provisional list. Collections of aecia on this host have been made at Racine, Radisson and Merrimack.

According to the inoculation experiments of Fraser (*Mycologia* 4:236, 6:25) the *Peridermium balsameum* Pk. of the provisional list is probably the aecial stage of *Uredinopsis*. There seems to be no way at present of determining with which of the five described species of *Uredinopsis* that occur in Wisconsin any particular specimen of the *Peridermium* is connected. Fraser has found that *Calyptospora goeppertiana* Kuehn also produces a *Peridermium* on *Abies balsamea*. This rust probably occurs also in Wisconsin but has not yet been collected.

Caeoma abietis-canadensis Farl. has been shown by Fraser (*Mycologia* 3:188, 5:238, 6:27) to be the aecial form of a *Melampsora* on *Populus grandidentata* which does not produce aecia on *Larix*. Probably some, if not all, of the uredinia and telia collected in Wisconsin on this host are of this race.

Entyloma lineatum (Cke.) Davis. Material that had been wintered out of doors was brought to germination in tap water slide cultures early in May. The normal germination appears to be in the sorus, isolated spores seldom germinating. The promycelium is consequently long (usually $35-50\mu$) and is flexuose and irregularly nodulose, reminding one of the conidiophores of *Ramularia*. The sporidia are borne in apical whorls of 2 to 4, are fusoid-cylindrical, $7-14 \times 2\mu$. The whorl of sporidia is detached intact together with about an equal length of the distal portion of the promycelium and then rises to the surface of the water in the currents of which it revolves and moves in a very irregular manner. This is the same method of detachment that takes place

in *Entyloma nymphaeae* (Cunn.) Setch. (Trans. Wis. Acad. Sci. Arts & Letters 11:176) and is probably correlated with the aquatic habit. It seems to be of service in increasing the flotation of the sporidia and the likelihood of their catching upon the host. That this method of detachment is not constant, however, is indicated by the fact that Setchell does not mention it in his account of the germination of the spores of this species but refers to the sporidia as falling from the promycelia. (Bot. Gaz. 19:188 [1894].)

Additional Hosts.

Not previously recorded as bearing the fungi mentioned in Wisconsin.

Peronospora parasitica (Pers.) Tul.—On *Arabis hirsuta*. Fish Creek.

Synchytrium aureum Schroet. A few galls on *Caltha palustris* apparently caused by this fungus were collected at Wausaukeee in August, 1913, but the material is scanty and immature.

Plasmopara pygmaea (Ung.) Schroet. Conidia and oospores on *Hepatica triloba*. Afton.

Peronospora grisea Ung. On *Veronica americana*. Ellison Bay.

Sphaerotheca mors-uvae (Schw.) B. & C. on *Ribes gracile*. Detroit Harbor.

Microsphaera alni (Wallr.) Wint. On *Alnus incana*. Wausaukeee. Perithecia sparse.

Dimerosporium collinsii (Schw.) Thuem. On *Amelanchier, oblongifolia*. Merrimack, May 3rd, 1913. (W. N. Steil). On leaf of preceding year but ascospores not yet formed.

Exoascus confusus Atk. On fruit of *Prunus virginiana*. Sturgeon Bay.

Exoascus insititiae Sadeb. On *Prunus pennsylvanica*. Sturgeon Bay, causing witches brooms.

Exoascus cerasi (Fckl.) Sacc. On *Prunus Cerasus* (cult.) Wyalusing.

Exoascus coerulescens (Mont. & Desm.) Tul. On *Quercus coccinea*. Richland Center. (R. A. Harper & G. M. Reed.)

Taphrina virginica Seym. & Sadeb. On *Ostrya virginiana*. Potosi.

I am indebted to Mr. H. G. MacMillan of the Wisconsin Agricultural Experiment Station for identification of specimens in this group.

Stagonospora intermixta (Cke.) Sacc. To this species I have referred specimens of which the following notes were made. On elongated light brown dead areas which soon spread over the whole leaf; pycnidia epiphyllous, scattered, dark brown, globose or depressed-globose, $60-100\mu$ in diameter; sporules at first hyaline and cylindrical becoming acute at one end with a central row of small guttulae, finally septate and tinted, $26-52 \times 3-4\mu$. On *Phalaris arundinacea*. Devils Lake, Wisconsin, August 5th, 1913. The pycnidial wall is usually thin at the base while the outer portion is thick and blackened.

Septoria agrimoniae-eupatorii Bomm. & Rouss. On *Agrimonia gryposepala*. Potosi and Glen Haven.

Septoria cacaliae Ell. & Kell. On *Cacalia atriplicifolia*. Lake Mills. Oct. 26, 1901.

Septoria silphii Ell. & Evht. On *Heliopsis scabra*. Madison. Sporules $26-36 \times 1\mu$. This species was described as having sporules $35-50 \times 1\mu$, but in specimens on *Silphium perfoliatum* collected at Madison they are but $26-36 \times 1\mu$. The spots tend to become white and arid with age.

Entomosporium maculatum Lev. var. *cydoniae* Sacc. On *Pyrus Aucuparia*. Devils Lake. Sporules $20(16-23) \times 8(6-10)\mu$.

Gloeosporium septorioides Sacc. On *Quercus rubra*. Devils Lake. In these specimens the sporules have a narrow median division of the cytoplasm which is sometimes apparent without staining.

Gloeosporium robergei Desm. On *Ostrya virginiana*. Somers, South Milwaukee and Devils Lake. In all the specimens which I have collected on this host the cuticle on the upper surface of the spots is rugose forming white dendritic lines. It is labeled var. *dendriticum* in our herbaria.

Gloeosporium ribis (Lib.) Mont. & Desm. On *Ribes Cynosbati*. Devil's Lake.

Marssonina martini (S. & E.) Magn. On *Quercus Muhlenbergii*. Bridgeport. Some of the leaves bear also larger paler spots usque 2 cm. in diameter with numerous acervuli resembling those of *Gloeosporium nervisequum* (Fckl.) Sacc. (*Gloeosporium canadense* E. & E.) but the sporules are uniseptate.

Cylindrosporium glyceriae Ell. & Evht. On *Glyceria canadensis*. Athelstane. The collection on this host bears longer sporules, an occasional one much longer, than the type.

Cylindrosporium betulae Davis. On *Betula alba papyrifera*. Wausaukee. Sporules usque 55 x 3 μ . Microconidia are quite common in this species seeming to be produced especially when the stroma is erumpent and naked.

Microstroma juglandis (Bereng.) Sacc. On *Carya glabra*. Potosi.

Septocylindrium ranunculi Pk. On *Ranunculus septentrionalis*. Madison.

Ramularia occidentalis Ell. & Kell. On *Rumex Britannica*. Madison and Athelstane.

Ramularia pratensis Sacc. On *Rumex Britannica*. Athelstane.

Ramularia desmodii Cke. On *Desmodium illinoense*. Bridgeport.

Ramularia effusa Pk. On *Vaccinium pensylvanicum*. Wausaukee. On these specimens the conidia are borne on definite orbicular spots about 5 mm. in diameter which also bear numerous black immature pycnidia.

Ramularia veronicae Fckl. On *Veronica serpyllifolia*. Madison. This specimen bears conidia 12–18 x 3 μ with a median division of the cytoplasm.

Ramularia asteris (Sacc.) Barth. On *Aster lateriflorus*. Devils Lake.

Fusicladium radiosum (Lib.) Lind. On *Populus balsamifera*. Sturgeon Bay. But a single collection has been made on this host.

Cercospora caricina Ell. & Dearn. On *Carex castanea* and *C. intumescens*. Wausauke. On *Carex retrorsa*. Detroit Harbor and Athelstane. In the specimen from the latter locality the conidiophores are only 15-25 μ long.

Cercospora rhoina Cke. & Ell. On *Rhus glabra*. Madison and Bridgeport.

Ustilago utriculosa (Nees) Tul. On *Polygonum lapathifolium*. Madison (W. N. Steil).

Uromyces halstedii de Toni. On *Leersia oryzoides*. Wisconsin river bottom opposite Bridgeport. The only previous collection of this rust in Wisconsin was a scanty one made by Dr. Arthur at the dells of the Wisconsin river in 1893 on *Leersia virginica*.

Uromyces scirpi Burr. *Scirpus validus* is given as a host of this rust in Wisconsin in *North American Flora*.

Uromyces junci-tenuis Syd. On *Juncus Dudleyi*. Uredinia and telia at Wausauke.

Uromyces proeminens (D C.) Lev. Telia on *Euphorbia glyptosperma*. Wausauke. This name is used instead of the later *Uromyces euphorbiae* Cke. & Pk. in the wide sense in which that name was used in the provisional list although it is also the name which is applied, in the narrow sense, to the particular race which occurs on this host species.

Uromyces hyperici-frondosi (Schw.) Arth. Uredinia and a few telia on *Hypericum Kalmianum*. Fish Creek.

Puccinia coronata Cda. Aecia on *Rhamnus lanceolata*. Glen Haven.

Puccinia andropogonis Schw. An Aecidium on *Linaria canadensis* in the herbarium of the University of Wisconsin which was collected at Mazomanie in June, 1908, is perhaps of this species.

Puccinia cyperi Arth. Uredinia and telia on *Cyperus Houghtonii*. Athelstane.

Puccinia patruelis Arth. Telia on *Carex pennsylvanica*. Madison (E. T. Bartholomew) *North American Uredinales*, 651.

Puccinia curtipes Howe. On *Tiarella cordifolia*. Devils Lake.

Phragmidium disciflorum (Tode) James. Uredinia and telia on *Rosa acicularis* at Ellison Bay are probably *Ph. rosae-acicularis* Liro if one accepts that as a distinct species.

Melampsoropsis cassandrae (Pk. & Cl.) Arth. Aecia (*Peridermium consimile* Arth. & Kern) on *Picea canadensis*. Wausaukee.

Uredinopsis atkinsonii Magn. A collection on *Cystopteris bulbifera* from the Wisconsin river bluff opposite Bridgeport I have referred to this species.

Additional Species.

Not previously reported as occurring in Wisconsin.

Plasmopara viburni Pk. On *Viburnum Opulus americanum*. Wausaukee and Athelstane. Conidia and oospores. Oospores subepidermal, oogonia globose, *usque* 48μ in diameter, wall often irregularly thickened; oospores globose, $24-37\mu$ in diameter, wall $2-4\mu$ thick, smooth or nearly so.

Asterina cupressina Cke. On *Juniperus communis depressa*. Fish Creek.

ASCOCHYTA WISCONSINA n. sp. ad interim. Spots orbicular to elliptical, gray with a narrow black border and frequently zonate above, brown with a less definite margin below, 1-3 cm. long; pycnidia epiphyllous, scattered, brown, prominent, globose to sublenticular, $85-110\mu$ in diameter; sporules ovoid to oblong, hyaline, $4-8 \times 2\frac{1}{2}-3\frac{1}{2}\mu$. Some of the longer sporules have a median septum and it is probable that well matured specimens would show this to be an *Ascochyta*. The affected leaf tissue seems quite friable and apparently fragments and falls away piecemeal. On *Sambucus canadensis*. Devils Lake. August 7, 1913. On examining a specimen of *Septoria sambucina* Pk. collected at Racine it was found to bear also an *Ascochyta* with

sporules 8-10 x $2\frac{1}{2}$ - 3μ . The pycnidia are epiphyllous on spots 1-2 cm. long which are sordid-arid with a purple border above, olivaceous below. I use this name for convenience until the relationship of the fungus to the various species that have been described on *Caprifoliaceae* is known.

Ascochyta caulicola Laubert (*Ascochyta lethalis* Ell. & Barth.)
On living stems of *Melilotus alba*. Madison (A. H. Gilbert).

Stagonospora paludosa (Sacc. & Speg.) Sacc. On *Carex retrorsa*. Athelstane.

Septoria betulicola Pk. The common *Septoria* on *Betula* in Wisconsin, first manifests itself by the formation of small (1-2mm.) scattered, angular, intervenular, black brown spots which are lighter colored below. These spots become surrounded by an indefinite yellow discoloration which later becomes of a more or less reddish brown above and light brown or buff below. These run together into indefinite areas usually 1-2 cm. in diameter. On the lower surface of these areas the usually few and scattered pycnidia are borne. These are subepidermal, globose, thick-walled, about 100μ in diameter. The sporules are straight to strongly curved, spuriously pluriseptate, $40-60 \times 1\frac{1}{2}-2\mu$. This is the form that is usually distributed under the name *Septoria betulicola* Pk. although *North American Fungi* 2nd series, 2166 which resembles it was issued as *Septoria betulae* (Lib.). Other specimens show smaller (ca. 5mm.) darker, more definitely limited areas which become cinereous above. *Septoria betulicola* apparently has not been reported in any of the Wisconsin lists. The characters of the sporules seem to ally this with *Septoria betulina* Pass. *Septoria betulae* (Lib.) West. was reported in the supplementary list 402a. The specimen upon which this record was based (Three Lakes, June 25th, 1892) bears circular light yellowish brown spots 1-2 mm. in diameter with a definite dark brown border. The pycnidia are epiphyllous but visible below, globose, thick-walled, about 80μ in diameter; the sporules straight or curved, triseptate, $30-40 \times 2\mu$. *Fungi Columbiani* 1586 on *Betula occidentalis*, collected in Oregon and issued as *Septoria betulicola* Pk. seems to differ from this only in the more irregular spots and the much paler and less distinct border.

Septoria alni Sacc. On *Alnus incana*. Wausaukee. Referred to this species because of the short sporules, the longest of which attain 40μ .

Septoria hepaticae Desm. On *Hepatica acutiloba*. Glen Haven. I have collected this but once when it occurred in connection with *Protomyces fuscus* Pk.

Septoria cassiaecola Kell. & Swingle. On foliage leaves of *Cassia chamaecrista*. Glen Haven. Amphigenous on intervenular areas of the leaflets which are not at first discolored but which become brown.

SEPTORIA SENECIONIS-AUREI n. sp. ad interim. On irregular indefinite grey portions of large brown areas of the radical leaves. Pyenidia epiphyllous, scattered, brown black, spherical, with a distinct cellular wall, $55-65\mu$ in diameter; sporules hyaline, straight, $16-26 \times 1\mu$. On *Senecio aureus*. Devils Lake, September 1, 1913. I use this name for convenience until the relation of the fungus to previously described forms such as *Septoria senecionis-sylvatici* Syd. and *S. adenocauli* E. & E. becomes known.

Gloeosporium cylindrospermum (Bon.) Sacc. On *Alnus incana*. Madison.

Marssonina neilliae (Hark.) Magn. On *Physocarpus opulifolius*. Wausaukee. Macroscopically this resembles *Entomosporium*. *Marssonina coronaria* (Ell. & Davis) is similar and doubtless closely related.

Marssonina baptisiae (E. & E.) On *Baptisia leucantha*. Bridgeport. The globose acervuli are not subcuticular, as one might infer from the description, but subepidermal or innate. Sporules as long as 33μ were observed. Septation of the sporules seems doubtful.

Marssonina rhabdospora (E. & E.) Magn. A collection on leaves of *Populus grandidentata* made on the bank of the Wisconsin river opposite Bridgeport September 18, 1913, bears hypophyllous subcuticular acervuli which are applanate to hemispherical, $75-150\mu$ in diameter. The affected leaf areas are first yellow, then brown, then indefinite sordid spots appear which become determinate, orbicular, arid, zonate, 3-5 mm.

in diameter with a narrow dark margin. In these spots the leaf parenchyma separates from the venules and probably falls away leaving the venular network. The zonate spots look much like the work of leaf miners, the dark lines suggesting burrows containing excreta. From the closely massed, erect, straight hyphae of the acervuli are abstracted hyaline filiform sporules $7-11 \times 2\mu$. *Fungi Columbiani* 1587 (on *Populus tremuloides*, Newfield, N. J. J. B. Ellis.) issued under the name *Septoria musiva* Pk. bears similar but somewhat larger spots (1-2 cm.) and sporules $18-30 \times 2-3\mu$ uniseptate. I am considering the Wisconsin collection to be a microconidial state of this which I refer to *Marssonina rhabdospora* E. & E.

Since this was written collections on *Populus grandidentata* have been made at Phlox and Neopit. The following notes were made from the latter: Spots circular, alutaceous shading outward into reddish brown and with a darker margin, the upper surface darker than the lower, 1-4 mm. in diameter, sometimes confluent; acervuli hypophylloous, usually few; sporules generally straight, uniseptate, $18-33 \times 2-3\mu$. In the Phlox collection the spots are more numerous, rather more angular and more frequently confluent.

CYLINDROSPORIUM VERMIFORME n. sp. Spots amphigenous, subcircular to irregular, immarginate, brown, 5-15 mm. in diameter; acervuli epiphyllous, scattered, subcuticular, flat, $40-60\mu$ in diameter; sporules, hyaline, vermiform, curved, sigmoid or flexuose, pluriseptate, $150-250 \times 4-5\mu$. On leaves of *Alnus incana* Devils Lake, Wisconsin. The sporules suggest eel worms in appearance. Specimens in the herbarium of the University of Wisconsin collected at Devils Lake, August 15th, 1906, by R. A. Harper show many of the sporules provided with a rostrum, $10-42 \times 1-1\frac{1}{2}\mu$, at the apex. A collection made in August, 1913, does not show the "rostrum" but one made September 1, 1913, showed some of the sporules so provided. Living sporules, germinating in water, in addition to the lateral germ tubes, put forth one from the apex so like the "rostrum" that I infer that the beak is a germ tube put forth while the sporule is still *in situ*. Some sporules bearing a beak put forth in water a second tube alongside the rostrum and similar to it. Because of the large, erumpent, fasciculate sporules this might be referred to *Hyphales*.

ASCOCHYTA SANICULAE n. sp. On indefinite, discolored, more or less mottled areas which may include the entire leaf; pycnidia scattered, innate, globose to lenticular, thin walled, light reddish brown with a round apical pore surrounded by a dark ring, $100-170\mu$ in diameter; sporules hyaline, cylindrical, usually straight, 4-guttulate, $20-30 \times 4-6\mu$. On leaves of *Sanicula marilandica*. Grant County, Wisconsin, September 19th, 1913. The pycnidia are very inconspicuous. They are most readily seen by transmitted light when they show as translucent points.

Cylindrosporium shepherdiae Sacc. (*Ann. Mycol.* 11:551. 1913). To this species, founded upon material collected at Field, B. C. by Dearnness, I am referring specimens from which the following notes were made. The spots are circular, reddish brown, concentrically rugose, 3-5 mm. in diameter. They have a greenish border and are seated upon an indefinite yellowish area. The epiphyllous pycnidia (?) are aggregated in the central portion of the spot, are soon erumpent, and widely open, the white mass of sporules within being visible under a hand lens. The sporules are hyaline, oblong-cylindrical, obtuse, pluriseptate, $18-40 \times 3-4\mu$. Collected on *Shepherdia canadensis* at two stations near Ellison Bay and at Detroit Harbor. I have not seen *Septoria argyraeae* Sacc. which I suspect is not very different.

RAMULARIA FRAXINEA n. sp. Spots none, the fungus appearing as small snow white patches on the lower surface of the leaves; conidiophores densely clustered on a more or less hemispherical stroma, hyaline, sometimes bulbous at base, $10-20 \times 3-4\mu$; conidia apical, hyaline, cylindrical, obtuse at both ends, distal $\frac{1}{3}-\frac{1}{2}$ more or less strongly curved, becoming 1-4 septate, $40-80 \times 4-5\mu$. On languishing leaves of *Fraxinus pennsylvanica*. Bridgeport, Wisconsin, September 17, 1913. The gross appearance suggests a light development of *Microstroma* and the shape of the conidia a hockey stick. Perhaps this should be referred to *Fusarium*. Since collected on *Fraxinus pennsylvanica lanceolata* at Maiden Rock.

Cercosporaella nivea Ell. & Barth. On *Solidago uniligulata*. Athelstane. The specimen referred here bears conidia usque $118 \times 3-4\mu$ on short conidiophores. The affected leaf areas are

not at first discolored but later become dead and brown and the air spaces contain hyaline mycelium and immature pycnidia or perithecia.

CERCOSPORA ECHINOCHLOAE, n. sp. Spots elongate-linear reddish brown, becoming arid in the center; conidiophores hypophylloous in small tufts, brownish tinted, continuous, straight or bent, entire or denticulate or oblique at the apex, $10-26 \times 4\mu$; conidia, hyaline, straight or curved, cylindric to obclavate-cylindrical, distinctly 1-7 septate, $23-53 \times 3-4\mu$. On leaves of *Echinochloa Crus-galli*. Devils Lake, Wisconsin, August and September 1, 1913.

Cercospora passaloroides Wint. Poor specimens of this fungus on leaves of *Amorpha fruticosa* were collected on the bank of the Wisconsin river opposite Bridgeport. Better specimens have been collected at Trempealeau.

FUSARIUM CARPINEUM n. sp. Hypophylloous on indefinite areas which often follow the principal veins and which come to have a wilted appearance and finally assume a lethal brown below and almost black above; sporodochia superficial, convex to subhemispherical, $25-40\mu$ in diameter, composed of globose cells $7-8\mu$ in diameter which become flask shaped and $12-15\mu$ long; conidia borne singly on the apex of these conidiophores, hyaline, cylindrical, obtuse at both ends, curved, biseptate, $35-50 \times 3-4\mu$. On *Carpinus caroliniana*, Wyalusing, June 12, 1913.

Uromyces graminicola Burr. Telia on *Panicum virgatum*. Madison. On the railroad right of way. Perhaps adventive.

Puccinia melicae (Erikss.) Syd. Uredinia on *Melica striata*. Vilas county. Treboux states as the result of inoculation experiment that this is one of the forms of crown rust (*Ann. Mycol.* 12:5:483 [1914]).

Puccinia gigantispora Bubak. Aecia and telia on *Anemone cylindrica* or *virginiana*. Glen Haven.

Puccinia cichorii (DC.) Bell. Uredinia and telia on *Cichorium Intybus*. Madison, (E. T. Bartholomew) *Fungi Columbiana* 3933.

Gymnosporangium corniculans Kern. Galls on *Juniperus horizontalis* on which were some dried teliospores agreeing with those of this species were collected on the lake Michigan beach east of Sturgeon Bay in June.

Hyalopsora aspidiotus Pk. Uredinia on *Phegopteris Dryopteris*. Detroit Harbor.

Melampsora farlowii (Arth.) n. comb. (*Necium farlowii* Arth.) On young twigs and leaves of *Tsuga canadensis*. Detroit Harbor.

Melampsora arctica Rostr. Aecia on leaves of *Abies balsamea* supposed to be of this species have been collected at Brule (E. M. Gilbert) Fish Creek and Ellison Bay. The reference to this species is based on the inoculation experiments of Fraser (*Mycologia* 4:187, 5:238). The uredina and telia have not yet been recognized in Wisconsin.

Aecidium xanthoxyli Pk. On *Zanthoxylum americanum*. Mazomanie (R. A. Harper & G. M. Reed) Glen Haven.

Aecidium proserpinaceae B. & C. On *Proserpinaca palustris*. Detroit Harbor. Abundant on the marshy border of a pond on Washington Island.

INDEX TO HOSTS MENTIONED IN "NOTES" I AND II.

Page	Page
Abies balsamea	96, 107
Acalypha virginica	94
Acer	80
Acer rubrum	81
Acer Saccharum	86
Acer spicatum	86
Agrimonia gryposepala	98
Alnus incana 94, 97, 103, 104	103
Ambrosia	94
Amelanchier	79
Amelanchier oblongifolia	97
Amorpha fruticosa	106
Amphicarpa monoica	96
Andropogon furcatus	88
Anemone cylindrica	106
Anemone quinquefolia	94
Anemone virginiana	106
Arabis hirsuta	97
Aster lateriflorus	99
Aster puniceus	86
Baptisia leucantha	103
Betula alba papyrifera	88, 99
Betula lenta	89
Betula occidentalis	102
Bidens	94
Cacalia atriplicifolia	98
Caltha palustris	91, 97
Carex	86, 88
Carex castanea	100
Carex gracillima	87
Carex intumescens	100
Carex pennsylvanica	100
Carex retrorsa 100, 102	100
Carex scabrata	92
Carex Tuckermani	92
Carpinus caroliniana	88, 106
Carya glabra	99
Cassia chamaecrista	103
Ceanothus americanus	86
Cichorium Intybus	106
Cinna arundinacea	87
Cyperus filiculmis	86
Cyperus Houghtonii	86, 100
Cystopteris bulbifera	101
Dendrobium moschatum	89
Desmodium canescens	79
Desmodium illinoense	99
Echinochloa crusgalli	106
Euphorbia glyptosperma	100
Fraxinus pennsylvanica	105
Geum canadense	85
Glyceria canadensis	98
Helenium autumnale	80
Helianthus	89
Heliopsis scabra	98
Hepatica acutiloba	103
Hepatica triloba	97
Hordeum jubatum	85
Humulus Lupulus	78
Hypericum Kalmianum	100
Hypericum virginicum	91
Juncus Dudleyi	100
Juniperus communis depressa	95
Juniperus horizontalis	107
Lappula virginiana	90
Leersia oryzoides	100
Liatris spicata	87
Linaria canadensis	100
Lycopus virginicus	85
Lysimachia terrestris	85
Melica striata	106
Melilotus alba	102
Oakesia sessilifolia	87
Osmunda regalis	84
Ostrya virginiana	98
Paeonia	91
Panicum virgatum	106
Pedicularis canadensis	85
Phalaris arundinacea	98
Phegopteris Dryopteris	107
Phryma Leptostachya	91
Physocarpus opulifolius	103
Picea canadensis	101
Pinus sylvestris	92
Pisum	93
Plantago Rugelii	84
Polygonum lapathifolium	100
Polymnia canadensis	88
Populus angustifolia	82
Populus balsamifera 81, 82, 99	81, 82, 99
Populus deltoides 81, 82, 83	81, 82, 83
Populus Fremonti	82
Populus grandidentata 83, 96, 103, 104	83
Populus tremuloides 81, 82, 104	81, 82, 104
Prenanthes alba	85
Proserpinaca palustris	107

Page		Page	
<i>Prunus Cerasus</i>	97	<i>Scirpus validus</i>	100
<i>Prunus pennsylvanica</i>	97	<i>Secale cereale</i>	95
<i>Prunus virginiana</i>	79, 97	<i>Senecio aureus</i>	96, 103
<i>Pyrus Aucuparia</i>	98	<i>Shepherdia canadensis</i>	105
<i>Quercus coccinia</i>	98	<i>Silphium perfoliatum</i>	98
<i>Quercus macrocarpa</i>	87	<i>Solidago uniligulata</i>	105
<i>Quercus Muhlenbergii</i>	99	<i>Sonchus asper</i>	92
<i>Quercus rubra</i>	98	<i>Thalictrum dasycarpum</i>	92
<i>Ranunculus recurvatus</i>	85	<i>Thalictrum dioicum</i>	92
<i>Ranunculus septentrionalis</i>	99	<i>Tiarella cordifolia</i>	101
<i>Rhamnus lanceolata</i>	100	<i>Tsuga canadensis</i>	96, 107
<i>Rhus glabra</i>	100	<i>Uvularia grandiflora</i>	87
<i>Ribes americanum</i>	90	<i>Vaccinium pensylvanicum</i>	99
<i>Ribes Cynosbati</i>	99	<i>Veronica americana</i>	97
<i>Ribes gracile</i>	97	<i>Veronica serpyllifolia</i>	99
<i>Rosa acicularis</i>	101	<i>Viburnum Opulus</i>	101
<i>Rubus hispida</i>	85	<i>Vicia</i>	93
<i>Rubus villosus</i>	85	<i>Vicia americana</i>	93
<i>Rumex Britannica</i>	99	<i>Vicia linearis</i>	93
<i>Sambucus canadensis</i>	101	<i>Viola pubescens</i>	85
<i>Sanicula marilandica</i>	105	<i>Zanthoxylum americanum</i>	107

NOTES ON PARASITIC FUNGI IN WISCONSIN—III.

Supplementary to a provisional list of parasitic fungi in Wisconsin. Trans. Wis. Acad. Sciences, Arts & Letters 17:2:846-984.

J. J. DAVIS.

The fungus recorded in the provisional list under the name *Synchytrium decipiens* Farl. is referred to the chytridiaceous genus *Woroninella* by H. Sydow using the combination *W. aecidioides* (Pk.) Syd. (Ann. Mycol. 12:5:484). Peck's original binomial was *Uredo aecidioides* which had been proposed previously for another fungus which fact has been held by some mycologists to invalidate the publication; hence the use of another specific name.

Oöspores occur in Wisconsin collections of *Plasmopara ribicola* Schroet. They are globose, brown, smooth, 33-36 μ in diameter; endospore 3-4 μ thick; oögonia 37-40 μ filled by the oöspores.

Peronospora parasitica (Pers.) Tul. Guy West Wilson proposes the division of this into two species and a like treatment of *P. effusa* (Grev.) Ces. (Mycologia 6:197 *et seq.*).

Peronospora trifoliorum D By., does not occur on clover in Wisconsin as far as observed even in fields where both *Trifolium* and *Medicago* are abundant and the latter infected. The conidia

exceed the dimensions given for this species. I append measurements made from the conidia of two collections:

May 13, 1914.	May 25, 1914.
31 x 22 μ	26 x 20 μ
26 x 18	22 x 19
30 x 21	22 x 18
29 x 17	26 x 22
26 x 16	25 x 22
34 x 24	22 x 18
26 x 22	24 x 18
29 x 20	22 x 19
30 x 25	26 x 19
29 x 18	

These measurements indicate that the conidia were larger on the earlier date. The meteorological records show that May 13th was a day of low temperature and low relative humidity (44°-62°. 39-25) while on May 25 the temperature ranged 62°-84° and the humidity 99-66. I take it that to the low temperature may be credited the larger conidia on May 13th. This reminds one of Melhus' finding that a comparatively low temperature favors germination of conidia of *Peronosporales*.

During one season, somewhere in the nineties, there appeared at one station in the suburbs of Racine a destructive outbreak of *Erysiphe* on *Galium aparine*. On examination from time to time no spores were found in the asci and no specimens were preserved for that reason as I did not know at that time that they were not formed during the season. The mildew was looked for during subsequent years but was not again seen.

From an examination of specimens of *Lophodermium pinastri* (Sehrad.) Chev. on *Pinus Banksiana* collected at Millston June 5, 1914, the following measurements were made: asci 115-185 x 22-30 μ : ascospores 55-100 x 3½-4 μ . It has been distinguished on the label in the herbarium as var. *amplum*. The affected leaves were still *in situ*.

Phyllosticta paviae Desm. is connected by V. B. Stewart with the ascigerous fungus *Laestadia aesculi* Pk. (Phytopath. 4:399.)

Phomopsis vexans (Sacc. & Syd.) Harter is the name given by Harter to the fungus recorded in the provisional list under the name *Phyllosticta hortorum* Speg. (Journ. Ag'l Research 2:338).

The *Septoria* which occurs on *Agrimonia* in Wisconsin bears smaller sporules than the *Septoria agrimoniae-eupatorii* Bomm. & Rouss. of Europe as described. They are usually $25-40 \times 1\mu$.

There is considerable variation in the appearance of *Septoria* on *Echinocystis* in Wisconsin. The spots are commonly small, round and arid such as are attributed to *Septoria sicyi* Pk. and *S. brencklei* Sacc. Sometimes, however, they are angular, intervenular, green becoming brown. This is more nearly the kind of spot described under *Septoria echinocystis* E. & E. Both types of spot are sometimes found on the same leaf. Dr. R. A. Harper kindly compared a Wisconsin specimen with green to brown angular spots with the type of *Septoria echinocystis* E. & E. in the Ellis herbarium and wrote as follows: "The spores agree as to size etc. The spots in the type are larger, more brownish in color and rounded with a well defined center. It seems however that it ought to be the same thing." (In lit. Apr. 30, 1914) As these two kinds of spots intergrade I cannot consider them as due to specific distinctness of the infecting agents but rather as shade and moisture forms on one hand and the results of sunshine and dry air on the other, the latter conditions favoring a process of delimitation. As to the size of the sporules I find them to range from $20-60 \times 1-2\mu$. In the form with round arid spots they are usually shorter than in the one with angular green-brown spots. For instance in a collection that could be referred to *S. brencklei* Sacc. most of the sporules are about 36μ long with an extreme length noted of 48μ . The collection of the *S. echinocystis* type from which a specimen was sent to Dr. Harper for the comparison has sporules $35-55 \times 1-1\frac{1}{2}\mu$. There seems to be no reason as yet for changing the record of these forms from *Septoria sicyi* Pk.

The entry *Septoria stachydis* Rob. & Desm. in the Wisconsin lists seems to have been founded upon immature specimens of another fungus.

In returning a portion of the type specimen of *Septoria intermedia* E. & E. Mr. Ellis wrote as follows on the packet: "There

was only one leaf; this is part of it. It seems to differ from *S. solidaginicola* in its shorter spores but it may turn out after all to be only a var. of the species", and then by way of postscript, "Try and look into it." I think that it is now safe to say that the name should be eliminated by reason of being applied to a short spored specimen of a *Septoria* that occurs in Wisconsin on both *Solidago* and *Aster* and known as *S. solidaginicola* Pk. According to the description the sporules of that species are 4μ in diameter while in our specimens they are $1\frac{1}{2}$ - $2\frac{1}{2}\mu$. Through the kindness of Dr. H. D. House I have had an opportunity to examine type material and find the sporules about $1\frac{1}{2}\mu$ thick.

Examination of Wisconsin specimens that were referred to *Phleospora oxyacanthalae* (Kze. & Schm.) Wallr. shows a fine branched mycelium, inter- and intra-cellular, ramifying through the affected portions of the leaves. The aerial branches of this mycelium constitute the conidia which are assurgent, more or less strongly curved sometimes even horse shoe shaped, pluriseptate, $60-100 \times 4-5\mu$. These form a loose white felt in patches on the lower surface of the leaves which suggest a powdery mildew. No spots are caused but the affected tissues finally become dead and brown.

Leptothyrium dryinum Sacc. Specimens on *Quercus rubra* collected at Minocqua have sporules $15 \times 10\mu$ like those of *Leptothyrium maculicolum* Wint. but the small fruit bodies borne on large pale leaf areas are characters of *L. dryinum* Sacc. A specimen collected at Racine is probably on *Quercus ellipsoidalis*. *Quercus alba* should be stricken from the list of hosts of this fungus in the provisional list as I find that the specimen in my herbarium on that host is *Phyllosticta phomiformis* Sacc.

Gloeosporium septorioides Sacc. Saccardo in his description states that the sporules are always continuous. Winter in his description of *Marsonia quercina* Wint. which Saccardo gives as a synonym, describes the sporules as uniseptate. Ellis & Everhart in their description of *Gloeosporium septorioides* Sacc. var. *major* E. & E. state that the endochrome is often indistinctly divided in the center. Wisconsin specimens on *Quercus rubra* show occasional sporules with a median septum and the two halves of the sporule separate at this point resulting in two in-

dependent sporules. Some of the sporules attain a length of 30μ .

Gloeosporium thalictri Davis. In specimens collected at Phlox the spots are larger (10–15 mm.) and sometimes less definite than in the type. They become sordid-arid above and the central portion falls away. The acervuli are light brown and amphigenous.

The fungus recorded in the provisional list under the name *Cylindrosporium leptospermum* Pk. was originally described as a *Cercospora* and the change, for which I was perhaps in some degree responsible, seems to me to have been ill advised. As I see it the fungus belongs in *Hyphales*, *Mucedinaceae*, *microneuriae*, *scolecosporae* and I know of no genus into which it fits.

As a result of inoculation experiment by B. B. Higgins the *Cylindrosporium padi* Karst. of the provisional list has been divided into three species and connected each with an ascigerous stage upon the fallen leaves the following spring. According to this classification our Wisconsin species would stand as follows:

Cylindrosporium hiemale Higgins

On *Prunus pennsylvanica*

cuneata

Cerasus (cult.)

Ascogenous state *Cocomyces hiemalis* Higgins.

Cylindrosporium prunophorae Higgins

On *Prunus domestica* (cult.)

Ascogenous state *Cocomyces prunophorae* Higgins.

Cylindrosporium lutescens Higgins.

On *Prunus serotina*.

virginiana

Ascogenous state *Cocomyces lutescens* Higgins. I assume that the fungus on *Prunus cuneata* is identical with that affecting other members of the host group. Inasmuch as the host of the typical *Cylindrosporium padi* Karst. is a member of the same group as are the hosts of *C. lutescens* Higgins the distinctness of the latter species is not established.

Ramularia dioscoreae Ell. & Evht. (Proc. Acad. Nat. Sci., Phila., 1891, p. 85) was founded upon leaves of *Smilax* bearing *Ramularia subrufa* Ell. & Hol. It is therefore to be elided.

Solidago ulmifolia where given as a host of *Ramularia virgaureae* Thuem. in the provisional list should be placed under *Ramularia serotina* E. & E. instead. *Ramularia virgaureae* Thuem. seems to vary from an *Ovularia* to a *Cercospora* type.

Piricularia parasitica Ell. & Evht. When well developed the conidia are produced into long slender tips as in *Cercospora* and may attain a length of 50μ .

Fusicladium radiosum (Lib.) Lind. In the provisional list this combination was erroneously attributed to Lindr. I have assumed that this is a widespread and variable species which includes the fungus occurring in Wisconsin the conidia of which vary from $15-30 \times 6-11\mu$. *Venturia tremulae* Aderh. in that case is the ascogenous state. Peck's description of his *Cladosporium letiferum* (40th Report, p. 64) applies very well to the fungus occurring in Wisconsin and I therefore take it to be a synonym. Quite different material was collected on *Populus tremuloides* at Pepin in August and referred to var. *microscopicum* (Sacc.) Allesch. The following notes were made from this material.

Spots 1-4 mm. in diameter, orbicular, sordid-arid above with a narrow, dark, raised margin, alutaceous below also with a dark margin and a central paler portion on which the conidiophores are borne; conidia continuous, $15-18 \times 4\mu$. This differs from the variety, as described, in the narrower, continuous, hypophyllous conidia as well as in the character of the spots.

In the 4th supplementary list, p. 78, I gave notes of a specimen that I had referred to *Cercospora megalopotamica* Speg. To indicate something of the variation I add notes regarding two further collections: Spots suborbicular, definite, immarginate, blackish brown becoming paler with age and finally white in the center, 2-10 mm. in diameter; conidiophores tufted, septate, smoky brown, $55-80 \times 4-5\mu$; conidia slender, straight, attenuate, pluriseptate, $60-125 \times 3\mu$. On *Bidens connata*, Price County, Sept. 9th, 1911.

Spots suborbicular, light brown with a purple margin and a white center, paler and devoid of purple below, 4-8 mm. in diameter; conidiophores amphigenous, fasciculate, varying from subhyaline to brown, straight, flexuose or bent, continuous, entire or toothed, $15-45 \times 3\mu$; conidia hyaline, straight, attenuate,

pluriseptate, 60–100 x 3–4 μ . On *Bidens connata*, Fountain City, August 12, 1914.

Telia of *Uromyces albus* (Clint.) Diet. & Hol. on leaves of *Vicia americana* were collected at Sharon in 1889. I am unable to perceive an arrangement of the verrucosities of the spore walls in rows.

The rust on *Hystrix patula* referred to *Puccinia apocrypta* Ell. & Tracy in the provisional list is probably *Puccinia impatiensis* (Schw.) Arth. as I am informed by Dr. Arthur.

Gymnoconia peckiana (Howe) Trotter is made up of the aecial *Caeoma nitens* Schw. and the telial *Puccinia peckiana* Howe. Kunkel doubts the relationship (Am. Journ. Bot. 1:37–45).

Telia of *Melampsoropsis cassandrae* (Pk. & Cl.) Arth. were collected at Solon Springs, June 15th, 1914.

ADDITIONAL HOSTS.

Plasmopara australis (Speg.) Swingle. On *Echinocystis lobata*. Galesville.

Peronospora parasitica (Pers.) Tul. On *Cardamine bulbosa*. Madison.

Peronospora trifoliorum D By. On *Astragalus canadensis*. St. Croix Falls.

Peronospora chamaecysis Wils. is the species that has been formed to include American forms such as were recorded in the provisional list as *P. euphorbiae* Fckl. (*Mycologia* 6; 204). On *Euphorbia glyptosperma*. Trempealeau.

Sclerospora graminicola (Sacc.) Schroet. On *Setaria glauca*. Bridgeport.

Sphaerotheca humuli (D C.) Burr. On *Viola canadensis*. Clintonville. Abundant at this station but confined to the single species of violet. *Viola scabriuscula* was abundant but entirely free from the mildew.

Erysiphe polygoni DC. On *Delphinium* (cult.) Poynette. (H. L. Russell?)

Asterina rubicola Ell. & Evht. On *Rubus occidentalis*.
Grant County, opposite Bridgeport.

Plowrightia morbosa (Schw.) Sacc. On *Prunus pumila*.
Shore of Lake Superior in Ashland or Iron County. (L. S. Cheney.) A specimen in the herbarium of the University of Wisconsin, collected in 1896, appears to be on this host.

Phyllosticta minima (B. & C.) Ell. & Evht. On *Acer saccharinum*. Galesville.

Phyllosticta phomiformis Sacc. On *Quercus bicolor*. Alma.
Apparently no one has referred this species to *Macrophoma*.

Phyllosticta decidua Ell. & Kell. What I take to be this fungus has been collected on *Hieracium aurantiacum* at Phlox.

Septoria alnifolia Ell. & Evht. On *Alnus crispa*. Vilas County.

Septoria dentariae Pk. On *Cardamine bulbosa*. Madison.

Septoria astericola Ell. & Evht. On *Aster Shortii*. Potosi.
Sporules 22-33 x 1 μ .

Septoria ribis Desm. On *Ribes nigrum* (cult.) Madison.
This was collected in November and the triseptate sporules, as is often the case with conidia late in the season, show a tendency to divide at the septa.

Septoria sambucina Pk. On *Sambucus racemosa*. Neopit.

Septoria atropurpurea Pk. On *Aster sagittifolius*. Grant County opposite Bridgeport. On *Aster laevis*. Wyalusing.
This has the dark purple spots with small central white areas but the sporules are 90-110 μ long as in *S. punicei* Pk.

Phleospora ulmi (Fr.) Wallr. On *Ulmus fulva*. Richland Center (Harper & Reed). Maiden Rock. If *Phleospora ulmi* (Fr.) Wallr. is a conidial state of *Euryachora ulmi* (Fr.) Schroet. and the ascigerous condition in Wisconsin is distinct from this and is what is known as *Dothidella ulmea* (Schw.) E. & E. then the conidial state must be distinct also and should have another name. Rehm has replaced the generic name *Dothidella* Speg. by the older *Euryachora* Fekl. (Ann. Mycol. 6:516). It would be best perhaps to designate the states as *Euryachora ulmea*

(Schw.) and *Septogloeum ulmeum*. Both the American and European specimens that I have seen have shorter sporules (often 30—40 μ) than the description indicates and are variable.

Gloeosporium septorioides Sacc. On *Quercus rubra*. St. Croix Falls. In this collection the sporules are mostly 18—22 μ long, continuous.

Gloeosporium caryae Ell. & Dearn. On *Carya cordiformis*. Trempealeau and St. Croix Falls. In these collections the acervuli are epiphyllous. This fungus received a second description under the same name by Ellis & Everhart, hence the citation of these authors in the provisional list.

Gloeosporium ribis (Lib.) Mont. & Desm. On *Ribes gracile*. Trempealeau.

Marssonina potentillae var. *tormentillae* Trail. On *Rubus triflorus*. Phlox. Subcuticular. Sporules 15—18 x 3—4 μ . Also collected at Solon Springs.

Microstroma juglandis (Bereng.) Sacc. On *Juglans nigra*. Galesville.

Monilia fructigena Pers. On fruit of *Prunus virginiana*, Millston and *P. pennsylvanica*, Solon Springs.

Ramularia rosea (Fckl.) Sacc. On *Salix rostrata*. Alma. *Salix pedicellaris*. St. Croix Falls.

Ramularia pratensis Sacc. On *Rumex altissimus*. Maiden Rock. Conidia about 30 x 3 μ continuous. Conidiophores mostly shorter.

Ramularia rufomaculans Pk. On *Polygonum scandens*. St. Croix Falls. Not abundant on this host.

Ramularia aequivoca (Ces.) Sacc. On *Ranunculus septentrionalis*. St. Croix Falls.

Piricularia grisea (Cke.) Sacc. On *Setaria viridis*. Bridgeport.

Passalora fasciculata (C. & E.) Earle. On *Euphorbia serpyllifolia*. St. Croix Falls.

Cercospora circumscissa Sacc. On *Prunus pennsylvanica*. Neopit.

Cercospora althaeina Sacc. On *Callirhoe triangulata*. Prairie du Chien and Grant County. The relationship to the form on *Althaea* is questionable. The conspicuous black-purple raised border of the spots in this collection give it a quite different appearance. I have labeled it var. *praecincta*.

Cercospora pentstemonis Ell. & Kell. On *Pentstemon grandiflorus*. Pepin.

Cercospora varia Pk. On *Viburnum acerifolium*. Devils Lake.

Uromyces acuminatus Arth. Aecia on *Steironema ciliatum*. Madison. But a scanty development on this host.

Uromyces proëminens (DC.) Lev. (*U. euphorbiae* of the provisional list). On *Euphorbia Geyeri* I, III, Pepin.

humistrata, III. Pepin.

heterophylla, III. Pepin.

The rust on the latter is *U. poinsetiae* Tranz. which is here considered a race.

Uromyces hyperici-frondosi (Schw.) Arth. Aecia, uredinia and telia on *Hypericum majus*. Devils Lake.

Puccinia andropogonis Schw. Aecia on *Pentstemon gracilis*. Millston.

Puccinia perminuta Arth. On *Agrostis perennans*. Alma.

Puccinia impatiens Arth. On *Elymus canadensis glaucifolius*. Maiden Rock.

Puccinia graminis Pers. Telia on *Calamagrostis canadensis*. Madison. (E. T. Bartholomew.)

Puccinia bolleyana Sacc. Aecia on *Sambucus racemosa*. Drummond. (L. S. Cheney)

Puccinia polygoni-amphibii Pers. Uredinia and telia on *Polygonum scandens*. St. Croix Falls. Uredinia on *Polygonum acre leptostachyum*. Madison.

Phragmidium disciflorum (Tode) James. (*Ph. americanum* (Pk.) Diet.) On *Rosa humilis*. Gaslyn and St. Croix Falls.

Pucciniastrum agrimoniae (Schw.) Tranz. Uredinia on *Agrimonia mollis*. Prescott and St. Croix Falls.

Uredinopsis atkinsonii Magn. Primary uredinia and telia on *Aspidium noveboracense*. St. Croix Falls.

In the provisional list no aecia on *Pinus* were recorded save an undetermined *Peridermium* on leaves of *Pinus Banksiana*. This was not because of the absence of such rust forms from the state, but because field work had not been done in the proper regions at the proper time to detect them. Since the list was prepared, however, some attention has been given them, the results of which it may be of interest to summarize.

The leaf *Peridermium* on *Pinus Banksiana* was collected in July 1907, near Gordon, Douglas County, and at Spooner, Washburn County. It is presumably connected with *Coleosporium* but has not been observed since. *Peridermium cerebrum* Pk. occurs throughout the range of *Pinus Banksiana* in the state and is quite abundant in some localities. Its effects are serious only when the infections are multiple or when it attacks the axis. The distribution of *Peridermium pyriforme* Pk. is also probably coextensive with the range of *Pinus Banksiana* in the state it having been collected in Jackson, Douglas and Vilas Counties, but it appears to be very sparsely distributed. In June, 1914, when special attention was given to it, no more than one specimen was collected in any locality. If this is connected with *Cronartium comandrae* Arth. it is not nearly so abundant or widespread as the telial form. *Peridermium comptoniae* Orton & Adams on the contrary, while it has been observed only in Douglas and Vilas Counties, occurs in considerable abundance both as to number of trees attacked and the extent of the outbreak on the individual tree. As I have seen it this usually occurs on the trunk near the base while *Peridermium pyriforme* Pk. I have seen only on branches. This is contrary to the statement of Arthur & Kern (*Mycologia* 6:132). Besides its native host, *Pinus Banksiana*, this rust attacked the young trees of *Pinus ponderosa* in the plantation of the Board of Forestry in Vilas County with severity; a severity due in large measure, doubtless, to the fact that the rust does not occur in the native habitat of this host and hence there has been no breeding out of susceptibility. Of the European *Peridermium fischeri* Kleb. which became thoroughly established on *Pinus sylvestris* in Door County, I have written elsewhere. It is hoped that with the destruction of the alternate host, *Sonchus*, this will disappear from

the state. On our more valuable species of pine, *Pinus Strobus* and *P. resinosa*, no rust has been observed in Wisconsin, and it is hoped that none will be introduced.

Filamentous processes from base to apex of the peridium occasionally occur in *Peridermium comptoniae* Orton & Adams.

Aecidium maianthae Schum. On *Maianthemum canadense*. Solon Springs. This is probably the aecial stage of the rust on *Phalaris arundinacea* that was recorded under the name *Puccinia sessilis* Schn. in the provisional list. While collecting it a single sorus, but a well developed one, was found on *Streptopus roseus*. Under similar circumstances I once found a single sorus on *Habenaria hyperborea*. Such occurrences seem significant as to the relation of the segregates from *Puccinia sessilis* Schn. This was erroneously given the name *Aecidium smilacinae* Schum. in the provisional list.

Aecidium ranunculacearum DC. In small quantity on *Ranunculus abortivus* at Solon Springs where it occurred abundantly on *Anemone quinquefolia*. The infection of the former host seems to be very exceptional.

ADDITIONAL SPECIES.

Not reported in the Wisconsin lists.

Uncinula parvula Cke. & Pk. On *Celtis occidentalis*. Madison.

Exoascus betulinus (Rostr.) Sadeb. On *Betula alba papyrifera*. Solon Springs. This was seen on but a single tree and confined to a single branch.

Exoascus communis Sadeb. On fruit of *Prunus cuneata*. Millston, Solon Springs and Boulder Junction. Abundant in the former locality in 1914. Exceptionally this attacks petioles and young leaves which are deformed thereby.

Taphrina flava Farl. On *Betula alba papyrifera*. Ellison Bay. I am indebted to Dr. Farlow for authentic material of this species for comparison. My notes of the Wisconsin collection were as follows: Affected areas subcircular, indefinite, yel-

lowish becoming brown below, light green above, about $1\frac{1}{2}$ cm. in diameter, sometimes confluent; asci hypophyllous, broad and truncate or somewhat rounded at base, obtusely rounded at apex, often more or less constricted in the middle, $30-36 \times 18-26\mu$. No stalk cell is produced. The constriction of the asci appears to be caused by the pressure of the encircling edge of ruptured cuticle and to be greater when the asci are scattered.

Phyllosticta populina Sacc. On *Populus deltoides*. Prescott. The light grey spots are circular to subcircular with a narrow brown margin, 4-8mm. in diameter. It was associated with a *Septoria*.

In Ellis & Everhart's "The North American Phyllostictas" under *Phyllosticta grossulariae* Sacc. reference was made to Wisconsin material on *Ribes floridum* (= *R. americanum*) but it appears not to have been placed in my herbarium and was not recorded in the provisional list. I have found it on *Ribes vulgare* (cult.) at Fountain City accompanying *Cylindrosporium ribis* but mostly immature.

Phyllosticta crataegi (Cke.) Sacc. On *Crataegus*. Maiden Rock. This appears to be very close to what has been called *Phyllosticta destruens* Desm. on *Prunus virginiana* and *Amelanchier*.

Vermicularia liliacearum West. Specimens on leaves of *Streptopus roseus* appear to be parasitic as one might perhaps expect from the relation of this fungus to *Colletotrichum* by reason of its imperfect pycnidia. The sporules are narrow ($3-4\mu$) in this collection.

Placosphaeria punctiformis (Fckl.) Sacc. On *Galium boreale*. Bridgeport. The spermogonial state of *Pseudopeziza repanda* (Fr.) Karst.

ASCOCHYTA *MARGINATA* n. sp. Spots circular to subcircular, 5-15 mm. in diameter, at first green becoming brown with a paler central portion and a darker periphery and a distinct narrow margin; pycnidia epiphyllous, scattered, pale brown, irregularly globose, about 100μ in diameter with a thin cellular wall and a dark ring around the pore; sporules hyaline, ovoid to oblong with rounded ends, some of them uniseptate, $6-12 \times 2-3\frac{1}{2}\mu$.

On *Aralia nudicaulis*. *Phlox*, Wisconsin, July 11, 1914. The smaller and continuous sporules are probably immature but are in the majority in the material examined. There is evidence that the affected tissues fragment and fall away, for the most part probably, before the full maturity of the fungus.

A collection on leaves of cultivated *Phlox* made at Racine, Oct. 1, 1896, should probably be referred to *Septoria phlogis* Sacc. & Speg. The spots have no colored border; the epiphyllous pycnidia are delicate; the sporules range from $25-75 \times 1-1\frac{1}{2}\mu$. Apparently the spots are brown and angular at first becoming white or sordid and more rounded in outline with maturity.

More or less of the distal portion of the leaves of *Carices* in Wisconsin are often observed to be dead and on examination scattered pycnidia are found. Specimens showing hyaline guttulate sporules $10-13 \times 2\frac{1}{2}-3\mu$ were referred to *Phyllosticta caricis* (Fckl.) Sacc. in the provisional list. Of a collection on *Carex sp. indet.* at Racine it was noted "sporules $10-13 \times 3-5\mu$ mostly becoming uniseptate; some of the sporules germinate without forming a septum." A collection from Gaslyn on *Carex pennsylvanica* bears 1-2 septate sporules $15-16 \times 4\mu$; one from Spooner on *Carex intumescens* has bisepitate sporules $16 \times 4\mu$; one from Oakwood on *Carex sp. indet.* shows 1-2 septate sporules $12-18 \times 4-5\mu$ while in a collection on *Carex pennsylvanica* made at Neopit the sporules are $18-26 \times 4-5\mu$, 3-4 septate. These seem to me to represent various degrees of maturity and development of a single fungus which is perhaps *Stagonospora caricinella* Brun. The Neopit collection bears also a *Septoria* having pycnidia about 100μ in diameter which contain sporules $37-55 \times 1\frac{1}{2}-1\mu$.

A specimen on *Carex retrorsa* collected at Athelstane agrees with the description of *Stagonospora paludosa* (Sacc. & Speg.) Sacc.

Septoria acerella Sacc. On *Acer Negundo*. Galesville. This agrees with the description given by Dr. Martin in "Septorias of North America". (Journ. Mycol. 3:79.)

Septoria lophanthi Wint. On *Agastache scrophulariaefolia*. St. Croix Falls. In these specimens the sporules vary in length up to 80μ .

SEPTORIA CYLINDROSPORA n. sp.

Pycnidia scattered, black, globose to lenticular with cellular walls, $125-200\mu$ in diameter; sporules hyaline, cylindrical, straight or slightly curved, $18-30 \times 2-3\mu$. On calyces, bracts, leaves, and upper part of stems (especially on the south side) of *Pedicularis canadensis*. Solon Springs, June 1914. Under iodine the sporules show a median division. I have not seen *Rhabdospora sceptri* Karst. of which this may be only a form differing in the straight cylindrical sporules. This might be referred to *Ascochyta*.

Septoria xanthifolia Ell. & Kell. On *Iva xanthifolia*. Alma.

Phleospora celtidis Ell. & Mart. On *Celtis occidentalis*. Wyalusing. In this collection the sporules attain a length of 100μ or more and become 8 or more septate.

Gloeosporium trifolii Pk. On *Trifolium pratense*. Minocqua. Abundant at one station.

Colletotrichum graminicolum (Ces.) Wilson. On leaves of *Echinochloa crusgalli*. Devils Lake. Setae $50-100 \times 5-6\mu$, sporules $16-24 \times 3\frac{1}{2}-6\mu$. Collected also at Alma and Maiden Rock.

COLLETOTRICHUM SORDIDUM n. sp.

Spots on the upper surface of the leaves varying from orbicular to irregular, light brown with a darker margin, 5-15 mm. in diameter to indefinite and more or less confluent into indefinite areas, cinereous above from loosened cuticle, on the lower leaf surface indefinite; acervuli epiphyllous, scattered, small, flat; sporules hyaline, cylindrical with rounded ends, straight, $21-33 \times 6\mu$; setae dark brown to black, mostly incurved, $50-75 \times 3-6\mu$ with a septum near the base below which the seta is abruptly dilated. The affected portions of the leaves become quite friable. On *Menispermum canadense*, Wisconsin river bottom opposite Bridgeport, July 31, 1914. As there is a possibility that this may connect with *Gloeosporium sordidum* Speg. of South America I have used the same specific name.

SACC.

Didymaria astragali (Ell. & Hol.) ~~—~~ (Ramularia astragali, Ell. & Hol.) On leaves of *Astragalus canadensis*. St. Croix Falls.

Ramularia spiraeae Pk. On *Physocarpus opulifolius*. Maiden Rock. Also observed at Dresser Junction, but too late in the season to secure good specimens.

RAMULARIA IONOPHILA n. sp.

Spots at first indefinite, green, angular, becoming suborbicular to irregular and more definite but not margined; conidiophores hypophylloous, hyaline, fasciculate from a more or less prominent stromatic base, straight or somewhat bent, continuous, $25-55 \times 3-4\mu$; conidia hyaline, apical or subapical, cylindrical, straight, 1-3 septate, $18-45 \times 3-4\mu$. On *Viola canadensis* Phlox, Wisconsin, July 1914. It may be that more knowledge of the Ramularias occurring on violets will bring together this and several other described species. The apex of the conidiophore frequently grows beyond the point where the conidium is borne.

CERCOSPORELLA SCIRPINA n. sp.

On elongate brown areas which become confluent; conidiophores in small tufts disposed in long intervenular lines, hyaline, continuous, subulate to cylindrical, often bent and denticulate above, $15-22 \times 4-7\mu$; conidia hyaline, straight or curved, obclavate-cylindrical, obscurely septate, $50-122 \times 3\mu$. On leaves of *Scirpus pedicellatus*. St. Croix Falls, August 25th, 1914.

CERCOSPORELLA FILIFORMIS n. sp.

Spots linear, brown, immarginate, $1/2-4$ cm. \times 1-2 mm.; conidiophores amphigenous, fasciculate, hyaline, continuous, somewhat lax, $10-15 \times 1-2\mu$; conidia apical, filiform, hyaline, more or less curved and lax, sometimes pseudoseptate, $30-75 \times 1-2\mu$. On leaves of *Anemone patens* var. *Wolfgangiana*. Millston, Wisconsin, June, 1914.

CERCOSPORELLA TRICHOPHILA n. sp.

Effused over indefinite areas on the lower surface of the leaves which are not discolored; mycelium hyaline, superficial, repent and ascending the trichomes; conidiophores racemose on the hyphae, hyaline, cylindrical to nodulose, straight, often oblique or denticulate at the apex, $10-15 \times 3-5\mu$; conidia hyaline, obclavate-cylindrical, curved, pluriseptate, $45-75 \times 3\mu$. On *Fraxinus pennsylvanica*. Bridgeport, Wisconsin, August 1914. The conidiophores and conidia develop especially on the trichomicolous hy-

phae. The leaf surface becomes dotted with black, globose to hemispherical, sclerotoid bodies apparently connected with the same mycelium. Macroscopically this fungus suggests a young *Erysiphe*. Its systematic position is not clear.

CERCOSPORA CAMPTOSORI n. sp.

Spots subcircular to angular, pale brown becoming dark brown with age, immarginate, 3-7 mm. in diameter; conidiophores amphigenous, more or less fasciculate, brown, usually undulate, nodulose or bent, sometimes 1-2 septate, 18-57 x 3-4 μ ; conidia hyaline, obclavate-cylindrical to flagelliform, straight, 40-100 x 3 μ . On *Camptosorus rhizophyllus*. Marquette State Park, Grant County, Wisconsin. August 1st, 1914. This differs from *Cercospora phyllitidis* Hume, as described, in the shorter conidiophores.

Cercospora muhlenbergiae Atk. On *Muhlenbergia sylvatica*. Kenosha County.

Cercospora comandrae Ell. & Dearn. On *Comandra umbellata*. Trempealeau. Curved and nodulose conidiophores are not infrequent.

Cercospora sanguinariae Pk. On *Sanguinaria canadensis*. Phlox.

CERCOSPORA ERYSIMI n. sp.

Spots pallid, subcircular, 3-5 mm.; conidiophores amphigenous, fasciculate, fuligineous, simple, straight or somewhat incurved, 30-55 x 3-4 μ ; conidia straight, obclavate, fuligenous tinted, about 5- septate, 45-75 x 3-4 μ . On leaves of *Erysimum cheiranthoides*. Alma, Wisconsin, August 13th, 1914.

Cercospora condensata E. & K. On *Gleditsia triacanthos*. Marquette State Park near Wyalusing. Conidia up to 110 μ in length were noted.

Cercospora negundinis Ell. & Evht. On *Acer Negundo*. Galesville and Alma. In this collection the conidia are hypophylous; the conidiophores range to 40-50 μ and the conidia to 150 μ in length. As many as 9 septa have been observed in the latter. The conidiophores are mostly scattered or in twos and threes. Also collected in Grant County with amphigenous conidia and at Bridgeport.

CERCOSPORA CORNI, n. sp.

Spots indefinite, pale brown, becoming mottled with purple especially above; conidiophores hypophylloous, scattered, erect or ascending, brown, septate, $25-40 \times 5-7\mu$; conidia apical, obclavate, bright brown, strongly pluriseptate, $70-160 \times 5-7\mu$. On leaves of *Cornus paniculata*. St. Croix Falls, Wisconsin, August 31st, 1914. The conidiophores sometimes spring from the arch of a superficial mycelium and are then shorter. The affected areas which are mostly $1\frac{1}{2}-1$ cm. in diameter finally become dark and dotted with small, black, globular, sclerotoid bodies which are perhaps young pycnidia or perithecia.

CERCOSPORA ARCTOSTAPHYLI n. sp.

Spots circular, definite, sordid-arid with a narrow purple border, sometimes confluent, 2-5 mm.; conidiophores epiphyllous, springing mostly from small, dark tubercles, subhyaline, straight, erect, $7-15 \times 3\mu$; conidia straight or slightly curved, acute, $30-50 \times 1-1\frac{1}{2}\mu$. On *Arctostaphylos Uva-ursi*. Millston, Wisconsin, June, 1914.

Cercospora echinocystis Ell. & Mart. On *Echinocystis lobata* and *Sicyos angulatus*. Maiden Rock. In these specimens the conidiophores are scattered rather than fasciculate. Conidia up to $185 \times 4\mu$ were measured.

Cercospora effusa (B. & C.) Ell. & Evht. (?). On *Lobelia siphilitica*. Alma. In this collection the lax, nodulose, tortuous, septate conidiophores are $75-150\mu$ long; the conidia $30-45\mu$ long, triseptate, becoming brown and constricted at the septa when old. *Cladosporium effusum* B. & C. was said to occur on *Polygonum punctatum*, *Lobelia puberula* and *L. siphilitica* and *Nabalus altissimus* but Berkeley stated that he had seen conidia only on *Polygonum* and that they are curved which is not true of the fungus referred to here. On *Fungi Columbiani* 2505 (on *Lobelia inflata*) I find conidia like those in the Wisconsin collection and also a few slender obclavate ones nearly 100μ long. That the latter were borne on the conidiophores I cannot say. The *Fungi Columbiani* specimen examined appears to bear a parasite producing small rod-like sporules in pycnidia. The conidiophores of the Wisconsin collection give off a few branches at or near a right angle.

Cercospora ageratoides Ell. & Evht. On *Eupatorium urticaefolium*. Galesville. In this collection the tufts are scattered over indefinite, but slightly discolored, spots.

Cercospora grindeliae Ell. & Evht. On *Grindelia squarrosa*. St. Croix Falls.

Cercospora absinthii (Pk.) Sacc. I am using this name to record the occurrence of a Dematiaceous fungus on leaves of *Artemisia ludoviciana* at St. Croix Falls regarding which the following notes were made: conidiophores amphigenous, scattered or in tufts of 2-6, more or less flexuous, pluriseptate, brown or olivaceous, $90-160 \times 4-7\mu$; conidia apical, obclavate to obclavate-cylindrical, fuligineous tinted, developing about 4 septa, $30-50 \times 4-6\mu$. The affected leaves show at first brown spots which become confluent into brown areas. The scattered distribution of the conidiophores and the wooliness of the leaves make this quite inconspicuous.

Uromyces astragali (Opiz) Sacc. I am using this name for the purpose of recording the occurrence of uredinia on *Astragalus canadensis* at St. Croix Falls. That this American rust is conspecific with the European one having its aecia on *Euphorbia Cyparissias* is questionable. The Sydows in *Monographia Uredinearum* state that it is not while Arthur in *North American Flora* refers it to that species under the synonym *Nigredo pustula* (Schroet.) Arth. (*Uromyces pustulatus* Schroet.) together with the *Uredo* on *Oxytropis* that has been known as *Uredo oxytropidis* (Pk.) De Toni. The statement of the Sydows that the uredospores on *Astragalus* in North America have 6-8 germ pores is not borne out by this material in which the pores are 3-4.

Aecidium lupini Pk. On *Lupinus perennis*. Millston. I am indebted to Dr. J. C. Arthur for the determination. In the 4th supplementary list mention was made of the occurrence of *Tuberulina persicina* (Ditm.) Sacc. on *Lupinus perennis* as evidence that the host bears an *Aecidium* in Wisconsin which however was not collected until 1914.

Aecidium liatridis Ell. & And. On *Liatris scariosa*. Solon Springs.

UNIVERSITY OF WISCONSIN HERBARIUM, MADISON, WISCONSIN,
APRIL, 1915.

INDEX TO HOSTS MENTIONED IN "NOTES" III.

	Page		Page
<i>Acer negundo</i>	264, 267	<i>Galium boreale</i>	263
<i>Acer saccharinum</i>	258	<i>Glechoma triacanthos</i>	267
<i>Agastache scrophulariaefolia</i>	264	<i>Grindelia squarrosa</i>	269
<i>Agrimonia mollis</i>	260	<i>Habenaria hyperborea</i>	262
<i>Agrostis perennans</i>	260	<i>Hieracium aurantiacum</i>	258
<i>Alnus crispa</i>	258	<i>Hypericum majus</i>	260
<i>Amelanchier</i>	262	<i>Hystrix patula</i>	257
<i>Anemone patens</i>	266	<i>Iva xanthifolia</i>	265
<i>Aralia nudicaulis</i>	264	<i>Juglans nigra</i>	259
<i>Arctostaphylos Uva-ursi</i>	268	<i>Liatris scariosa</i>	269
<i>Artemisia ludoviciana</i>	269	<i>Lobelia inflata</i>	268
<i>Aspidium noveboracense</i>	261	<i>Lobelia puberula</i>	268
<i>Aster</i>	254	<i>Lobelia siphilitica</i>	268
<i>Aster laevis</i>	258	<i>Lupinus perennis</i>	269
<i>Aster sagittifolius</i>	258	<i>Maianthemum canadense</i>	262
<i>Aster Shortii</i>	258	<i>Medicago</i>	251
<i>Astragalus canadensis</i>	257, 265, 269	<i>Menispermum canadense</i>	265
<i>Betula alba</i>	262	<i>Muhlenbergia sylvatica</i>	267
<i>Bidens connata</i>	256, 257	<i>Nabalus altissimus</i>	268
<i>Calamagrostis canadensis</i>	260	<i>Pedicularis canadensis</i>	265
<i>Callirhoe triangulata</i>	260	<i>Penstemon gracilis</i>	260
<i>Camptosorus rhizophyllus</i>	267	<i>Penstemon grandiflorus</i>	260
<i>Cardamine bulbosa</i>	257, 258	<i>Phalaris arundinacea</i>	262
<i>Carex</i>	264	<i>Physocarpus opulifolius</i>	266
<i>Carex intumescens</i>	264	<i>Pinus Banksiana</i>	252, 261
<i>Carex pennsylvanica</i>	264	<i>Pinus resinosa</i>	262
<i>Carex retrorsa</i>	264	<i>Pinus Strobus</i>	262
<i>Carya cordiformis</i>	259	<i>Pinus sylvestris</i>	261
<i>Celtis occidentalis</i>	262, 265	<i>Polygonum acre</i>	260
<i>Comandra umbellata</i>	267	<i>Polygonum punctatum</i>	268
<i>Cornus paniculata</i>	268	<i>Polygonum scandens</i>	259, 260
<i>Crataegus</i>	262	<i>Populus deltoides</i>	262
<i>Delphinium</i>	257	<i>Prunus Cerasus</i>	255
<i>Echinochloa crusgalli</i>	265	<i>Prunus cuneata</i>	255, 262
<i>Echinocystis</i>	253	<i>Prunus domestica</i>	255
<i>Echinocystis lobata</i>	257, 268	<i>Prunus pennsylvanica</i>	255, 259
<i>Elymus canadensis</i>	260	<i>Prunus pumila</i>	258
<i>Erysimum cheiranthoides</i>	267	<i>Prunus serotina</i>	255
<i>Euphorbia Cyparissias</i>	269	<i>Prunus virginiana</i>	255, 259, 263
<i>Euphorbia Geyeri</i>	260	<i>Quercus bicolor</i>	258
<i>Euphorbia glyptosperma</i>	257	<i>Quercus ellipsoidalis</i>	254
<i>Euphorbia heterophylla</i>	260	<i>Quercus rubra</i>	254, 259
<i>Euphorbia humistrata</i>	260	<i>Ranunculus abortivus</i>	262
<i>Euphorbia serpyllifolia</i>	259	<i>Ranunculus septentrionalis</i>	259
<i>Eupatorium urticaefolium</i>	269	<i>Ribes americanum</i>	262
<i>Fraxinus pennsylvanica</i>	266	<i>Ribes gracile</i>	259
<i>Galium Aparine</i>	252		

	Page		Page
<i>Ribes nigrum</i>	258	<i>Sicyos angulata</i>	268
<i>Ribes vulgare</i>	262	<i>Smilax</i>	255
<i>Rosa humilis</i>	260	<i>Solidago</i>	254
<i>Rubus occidentalis</i>	258	<i>Solidago ulmifolia</i>	256
<i>Rubus triflorus</i>	259	<i>Sonchus</i>	261
<i>Rumex altissimus</i>	259	<i>Steironema ciliatum</i>	260
<i>Salix pedicellaris</i>	259	<i>Streptopus roseus</i>	262, 263
<i>Salix rostrata</i>	259	<i>Trifolium</i>	251
<i>Sambucus racemosa</i>	258, 260	<i>Trifolium pratense</i>	265
<i>Sanguinaria canadensis</i>	267	<i>Ulmus fulva</i>	258
<i>Scirpus pedicellatus</i>	266	<i>Viburnum acerifolium</i>	260
<i>Setaria glauca</i>	257	<i>Vicia americana</i>	257
<i>Setaria viridis</i>	259	<i>Viola canadensis</i>	257, 266

NOTES ON PARASITIC FUNGI IN
WISCONSIN IV, V, VI.

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XIX, PART II

Issued March, 1919

19 AUG 1958

* NOTES ON PARASITIC FUNGI IN WISCONSIN—IV:

J. J. DAVIS.

A provisional list of parasitic fungi in Wisconsin was published in the Transactions of the Wisconsin Academy of Science, Arts & Letters, 17²:846–984. Supplementary notes bearing the title above were issued in the same publication, 18¹:78–92 (I) 93–109 (II) and 251–271 (III).

Parasitic fungi were less abundant in Wisconsin than usual in 1915. This may be attributed to a reversal of season in the spring, a warm April having been followed by a cold May.

In the first number of these notes there was mention of the occurrence of *Plasmopara humuli* Miyabe & Takahashi on *Humulus Lupulus* at Racine in southeastern Wisconsin. This seems to be the first, and as yet the only, American locality from which this Japanese mildew has been reported. In September, 1915 it was collected on the same host near Lynxville on the Mississippi and at Gays Mills and Petersburg in the Kickapoo valley in western Wisconsin. At Lynxville the Japanese host *Humulus japonicus* was abundant on vacant lots and it was also observed at Gays Mills in cultivation and as an escape but the mildew was not found on this species.

Dimerosporium collinsii (Schw.) Thuem. is referred to a new genus, *Apiosporina*, by von Hoehnel. (*Fragm. zur Mykol.* no. 506).

For the “black knot” fungus recorded under the name *Plowrightia morbosa* (Schw.) Sacc. the new genus *Dibotryon* is proposed by Theissen and Sydow. (*Ann. Mycol.* 13: 663.)

The fungus recorded in the provisional list under the name *Dothidella ulmea* (Schw.) Ell. & Evht. and referred to in

“Notes” III:258, as *Euryachora ulmea* (Schw.) Rehm is referred to *Gnomonia* by Theissen and Sydow. Von Thuemen referred it to this genus in *Flora*, 1878, p. 178, and *Gnomonia ulmea* (Schw.) Thuem. was given in Saccardo’s *Sylloge Fungorum* 1:570 in the section *Dubiae*. Klebahn has shown that *Phleospora ulmi* (Fr.) Wallr. which Fuckel thought to be a conidial state of this fungus is really connected with *Mycosphaerella*.

A form of *Phyllactinia corylea* (Pers.) Karst. occurs at Madison and in Buffalo county near Arcadia on *Quercus velutina* in which a profuse superficial mycelium is developed.

According to Theissen and Sydow *Physalospora ambrosiae* Ell. & Evht. as given in the provisional list is *Phyllachora ambrosiae* (B. & C.) Sacc. (*Ann. Mycol.* 13:556).

Gnomonia caryae F. A. Wolf has been collected at Madison on leaves of *Carya ovata* that had borne *Gloeosporium caryae* Ell. & Dearn. the previous year. It occurred both on leaves lying on the ground and those wintered in a wire cage. We find the ascospores about 2μ thick.

Montagnella heliopsisidis (Schw.) Sacc. is referred to the genus *Rosenscheldia* by Theissen and Sydow (*Ann. Mycol.* 13:649).

Phyllachora junci (Fr.) Fckl. is referred to their genus *Endothella* by Theissen and Sydow (*Ann. Mycol.* 13:586). On the following page they refer to a collection of *Endothella strelitiae* (Cke.) Theiss. & Syd. on *Strelitzia angusta* made at Madison by Trelease.

The record of *Exoascus cerasi* (Fckl.) Sacc. in “Notes” II, p. 97 seems to have been due to an error. No Wisconsin specimen of this species is in the herbarium.

The name *Stagonospora smilacis* (E. & M.) Sacc. was used in the provisional list to designate the fungus that causes orbicular, sordid-arid, purple or brown bordered spots on leaves of *Smilax*. As usually collected the pycnidia contain continuous sporules varying in different specimens from oblong-fusoid and up to 21μ long to broad oval or subglobose. This is usually distributed as *Phyllosticta smilacis* Ell. & Mart. which it doubtless is. As the leaf tissue included in the spot usually disintegrates I assume that the sporules seldom reach maturity on the host and

as septate sporules are now and then found, that septation comes with maturity. A collection on *Smilax rotundifolia* from Lynxville bears ovoid or ovate more deeply tinted smaller sporules and is perhaps *Ascochyta confusa* Ell. & Evht. [See Dearness. *Mycologia* 9: 359-60.]

Septoria canabina West. of the provisional list should be *Septoria cannabis* (Lasch.) Sacc. In a specimen from Lynxville the sporules are 25-45 (mostly 30-36) \times 2-2 $\frac{1}{2}$ μ .

The host given as *Rumex altissimus* in the provisional list is probably *R. mexicanus*.

R. E. Stone finds *Septoria ribis* Desm. to be genetically connected with *Mycosphaerella grossulariae* (Fr.) Auersw. (*Phytopathology* 6:109).

The fungus recorded in the provisional list under the name *Cylindrosporium ribis* Davis is evidently conspecific with Brenckle's *Fungi Dakotenses* 320 which was determined by Saccardo as *Septoria sibirica* Thuem. Saccardo gives a description in *Annales Mycologici* 13:122. This seems quite different from European material distributed under this name.

For the fungus described by Trelease under the name *Ascochyta salicifoliae* and referred to *Septoria* by Berlese & Voglino and by Ellis & Everhart I am using the name *Cylindrosporium salicifoliae* (Trel.) as better expressing the acervular character of the spore body as I find it.

Dr. E. A. Burt of the Missouri Botanical Garden has kindly examined the type of *Gloeosporium (Marsonia) meliloti* Trel. and sent mounted sections thereof. It proves to be the *Ascochyta caulincola* of Laubert and *A. lethalis* Ell. & Barth. R. E. Stone has connected it with an ascigerous form to which he gave the name *Mycosphaerella lethalis* Stone. In the description Trelease designated the spore bodies "Perithecia" which was changed to "acervuli" in the *Sylloge Fungorum* doubtless to conform to the character of the genus to which it was referred. The word pycnidium was not then in use.

Examination of type material of *Gloeosporium populinum* Pk. received from Dr. H. D. House shows it to be the same as

Marssonina rhabdospora (Ell. & Evht.) Magn. Both specific names were published in 1893 but Peck's description probably was issued later in the year than Ellis & Everhart's.

As I see it the fungus known as *Gloeosporium trifolii* Pk. develops, when perfectly formed, which often it is not, a definite pycnidial wall and the sporules, when mature, have a median septum. Occasional sporules develop 2-3 septa as is so frequently the case in *Ascochyta*. I have not had the opportunity to bring them to germination to see if they then become tri-septate as is the case in *Stagonospora dearnessii* Sacc. on *Trifolium repens*. What appears to be a state of this, probably immature, has been collected with sporules but about $8 \times 2\frac{1}{2}\mu$, continuous and what is possibly a spermogonial or microconidial state occurs frequently with sporules $4-8 \times 1-1\frac{1}{2}\mu$, continuous. In this form the distal portion of the pycnidium is imperfect and it is much like the fungus on *Medicago* known as *Sporonema phacidoides* Desm.

Specimens of *Ramularia ionophila* Davis collected at Long Lake in 1915 show that the spots become light yellowish brown with the death of the included leaf tissue and that the conidia are often catenulate. The spots are usually 2-5 mm. in diameter and the limiting veinlets sometimes give the appearance of a narrow colored margin. It was confined here, as in the type locality, to the single species of host, *Viola canadensis*.

When well developed *Ramularia nemopanthis* Pk. is of the *Ovularia* type, the conidia being continuous, catenulate, $7-15 \times 3-6\mu$.

In "Notes" I: 89-90 it was noted that *Ovularia asperifolii* Sacc. var. *lappulae* Davis seems quite similar to var. *sympyti-tuberosi* Allesch. Jaap has raised the latter to specific rank and referred it to *Ramularia* because of occasional septate conidia (*Ann. Mycol.* 14: 41). When conidia are borne in chains the proximal members are usually longer than the distal and sometimes septate. I take it that the septum is due to a failure of the abstraction process which becomes less active toward the base of the chain. In such forms the distinction between the genera is difficult to hold. I am inclined to think that it would be better to include in *Ovularia* only species that bear ovoid conidia singly.

The fungus referred to *Fusicladium radiosum* (Lib.) Lind var. *microsporum* (Sacc.) Allesch. in "Notes" III: 256, is perhaps not distinct from *Cladosporium subsessile* Ell. & Barth. The conidia are 12-15 x 4 μ , continuous. This has since been collected at Whitehall.

A specimen on *Aster puniceus* was collected in Oconto County, Wisconsin, July 19, 1909, and placed in my herbarium with *Cercospora cana* Sacc. and *Aster puniceus* was given as a host of this species in the provisional list. Inside the packet I find the following description: On angular or indefinite areas that finally become brown; conidiophores hypophyllous, fasciculate, cylindrical or tapering upward, denticulate, sometimes branched, 20-35 x 5 μ ; conidia hyaline, obclavate, pluriseptate, straight, or curved, 60-130 x 3 μ . In the absence of definite knowledge of the relationship of this to *Cercospora cana* Sacc. on *Erigeron* and to *C. reticulata* Pk. *C. nivea* Ell. & Barth., *C. ontariensis* Sacc. and *C. dearnessii* Bubak & Sacc. on *Solidago*, I am designating it *Cercospora cana* Sacc. var. GRACILIS n. var.

Specimens of *Cercospora corni* Davis collected at Gays Mills in September show some of the conidia darker, thicker walled and strongly constricted at the septa, suggesting ultimate division into separate globose cells which might perhaps retain vitality through the winter.

To the original description of *Cercospora ageratoides* Ell. & Evht. (*Journ. Mycol.* 5: 71) is appended a reference to a form on *Eupatorium album* having shorter (40 μ) conidiophores and longer (70-80 μ) and narrower (3 μ) conidia. In a collection on *Eupatorium urticaefolium* from Lynxville the conidiophores are 20-40 x 3-6 μ , and the conidia up to 100 x 3-4 $\frac{1}{2}$ μ , effused over indefinite areas.

Cercospora zebrina Pass. is referred to *C. helvola* Sacc. as a variety by Ferraris (*Fl. Ital. Crypt.* 1:8:423.).

Urocystis waldsteiniae Pk. was inadvertently omitted from the provisional list. It has been collected but once in Wisconsin but it was then abundant at the station which was at Planting Ground lake near Three Lakes.

A. A. Potter reports that the smut given in the provisional list as *Sphacelotheca sorghi* (Lk.) Clinton is *S. cruenta* (Kuehn) Potter. (*Phytopathology* 5:152-3.)

Puccinia caricis-solidaginis Arth., *P. caricis-asteris* Arth., *P. caricis-erigerontis*, Arth., and *P. dulichii* Syd. are now included in *P. extensicola* Plowr. by Arthur (*Mycologia* 7:70 and 80-81.)

I am informed by Dr. Arthur that the rust on *Melica striata* that was recorded in "Notes" II under the name *Puccinia melicae* (Erikss.) Syd. is *P. erikssonii* Bubak. It has since been collected at Solon Springs on the same host.

The rust on *Agropyron repens* given in the provisional list under *Puccinia rubigo-vera* (DC.) Wint. is now believed to be *P. agropyri* Ell. & Evht. developing its aecia on Ranunculaceous hosts. *P. tomipara* Trel. probably belongs here also. (*Mycologia* 7:73-5.) It has been collected on *Agropyron tenerum* also at Solon Springs where "Aecidium ranunculacearum" occurred on *Anemone quinquefolia*.

Cultures made by Dr. Arthur have shown that *Aecidium nesaeae* Ger. is the aecial stage of *Puccinia minutissima* Arth. (*Mycologia* 7:86).

For the rust of which *Caeoma abietis-canadensis* Farl. is the aecial form Ludwig makes the new combination *Melampsora abietis-canadensis* (*Phytopath.* 5:279). There is objection by some mycologists to the extension of aecial specific names to apply to telial states and the objection is especially cogent when the name is derived from that of the aecial host of a heteroecious species. Many rust names are derived from that of the telial host and it is confusing to have introduced among them an occasional one taken from that of the aecial host. In the present case, as in others, the aecial host bears also telia referred to another species and that is the one that the name would suggest. To the present day uredinologist this is a matter of little importance but when one considers the generations of botanists to come it seems well worth while to remove these obstacles from a path that is none too smooth. I am using in the herbarium *Melampsora populi-tsugae* nom. nov. referring to it specimens on *Populus grandidentata* from Gaslyn (II) and Racine (II, III), and on *Populus tremuloides* from Wausaukeee.

For want of another I used in the provisional list the name *Puccinia impatientis* Arth. for a species forming uredinia and telia on *Elymus*. For this I suggest the designation *Puccinia elymi-impatientis* nom. nov. For the rust given in the provisional list as *Puccinia albiperidia* Arth. I am now using the name *Puccinia pringsheimiana* Kleb. as there seems to be no reason for considering the American rust as distinct from that of Europe.

ADDITIONAL HOSTS

Albugo candida (Pers.) Kuntze. On *Dentaria diphylla*. Laona. Oospores only; in leaves.

Basidiophora entospora Roze & Cornu. On *Erigeron canadense*. Long Lake. Monstrous conidia, up to $63 \times 30\mu$, with suppression of conidiophores were found in this collection (Cfr. Farlow, *Botanical Gazette* 7:311).

Peronospora potentillae D By. On *Agrimonia mollis*. Lynxville.

Peronospora trifoliorum D By. Collected in small quantity on *Lupinus perennis* at Millston.

In "Notes" I, p. 85 mention was made of the collection of *Synchytrium* at Athelstane on *Rubus hispida* and on no other host. The station was visited again in July, 1915, but the organism was not found on *Rubus*. It was found however, in small quantity, on *Viola conspersa* and on a single leaf of *Clintonia borealis*. In August collections were made at Solon Springs on *Viola conspersa*, *Halenia deflexa*, and in small quantity on *Rubus triflorus*. It may be that these represent more than one species but the effects of stage of development, host and environment have not been worked out.

Sphaerotheca humuli fuliginea (Schl.) Salm. On *Bidens cernua*. Madison.

Microsphaera alni (Wallr.) Wint. On *Ostrya virginiana*. Lynxville. *Juglans cinerea*, Madison. *Lonicera hirsuta*, Solon Springs.

Microsphaera diffusa C. & P. On *Symporicarpos orbiculatus* (cult.) Madison. (Denniston and Trelease.)

Erysiphe graminis DC. Conidia on *Poa triflora*. Solon Springs. Perithecia on *Hordeum vulgare* (cult.) Madison (C. S. Reddy).

Erysiphe cichoracearum DC. On *Napaea dioica*. Gays Mills.

Epichloe typhina (Pers.) Tul. On *Glyceria nervata*. Athelstane.

Exoascus communis Sadeb. "On fruit of wild plum" Madison. (A. B. Seymour, Econ. Fungi 31) and Racine.

In the preliminary list of parasitic Fungi of Wisconsin Trelease recorded *Exoascus pruni* Fckl. "On the fruit of *Prunus*," causing "plum pockets" or "bladder plums." This may have been, in part at least, what is now known as *Exoascus communis* Sadeb. on native plums. Atkinson, however, referred to specimens on *Prunus domestica* from Wisconsin (*Cornell University Ag'l Exp. Station Bulletin* 73: 329).

Taphrina coerulescens (Desm. & Mont.) Tul. On *Quercus ellipsoidalis*. Athelstane and Solon Springs.

Taphrina potentillae (Farl.) Johans. On *Potentilla canadensis*. Merrimack.

Phyllosticta cruenta (Fr.) Kickx. On *Polygonatum biflorum*. Marquette State Park, Grant County. Red border of spots 1 mm. or less wide; sporules very large, 18-24 x 6-9 μ .

Phyllosticta minima (B. & C.) E. & E. On *Acer saccharinum*. Wisconsin river bottoms opposite Bridgeport. On dark brown spots which become alutaceous except the peripheral portion.

In specimens of what appears to be *Phyllosticta decidua* Ell. & Kell. on leaves of *Agrimonia striata* collected at Long Lake the older sporules (7-10 x 3 $\frac{1}{2}$ -5 μ) are distinctly brown. In another collection on the same host, same locality and same day the sporules (4-7 x 3 μ) have a fuligineous coloration.

Septoria epilobii West. On *Epilobium adenocaulon*. Lady-smith. This is the fungus described under this name by Ellis & Everhart in *Journal of Mycology*, 3:81.

Septoria erigerontis Pk. On *Erigeron canadense*, Long Lake. There is much diversity in *Septoria* on *Erigeron*. In this collection the pycnidia are scattered through indefinite, somewhat paler areas which become confluent and mottled with small (2-4 mm.) indefinite, dead spots before the death of the entire leaf. The sporules are subarcuate, $21-38 \times 1\frac{1}{2}-2\mu$ and appear rigid. At the other extreme is *Fungi Columbiani* 1680 on the same host species with definite small (1 mm.) white-arid, conspicuously bordered spots bearing each one or two pycnidia containing sporules that are usually narrow ($1-1\frac{1}{2}\mu$) lax and thread-like. I have labeled the Long Lake collection var. *EFFUSA* n. var.

Phleospora aceris (Lib.) Sacc. On *Acer saccharinum*. Wisconsin river bottoms opposite Bridgeport.

Gloeosporium nervisequum (Fckl.) Sacc. On *Platanus occidentalis*. From a tree on the university campus. (H. R. Rosen.)

Marssonina castanei (Desm. & Mont.) Magn. On *Populus balsamifera*. Laona.

Cylindrosporium saccharinum Ell. & Evht. On *Acer spicatum*. Athelstane. Sporules $30-40 \times 2\mu$ crescentic, 3-septate, borne in imperfect pycnidia. Doubtfully distinct from *Phleospora aceris* (Lib.) Sacc.

The fungus that was reported in Notes II under the name *Cylindrosporium vermiforme* Davis has been collected at Millston on *Corylus americana*. The larger sporules are 6μ in diameter.

Ramularia uredinis (Voss) Sacc. On *Populus deltoides*. Madison. On *Salix cordata*. Lynxville. Parasitic, together with *Darluca filum* (Biv.) Cast., on *Melampsora*.

Ramularia multiplex Pk. On *Vaccinium Oxycoccus*. Solon Springs.

Septocylindrium concomitans (Ell. & Hals.) Hals. On *Bidens vulgata*. Ladysmith.

Ramularia virgaureae Thuem. On *Solidago altissima*. Lynxville. Well developed conidia are obclavate and sometimes attain a length of 100μ . This fungus varies from an *Ovularia* to a *Cercospora* type according to the activity of the abstraction process.

Entyloma compositarum Farl. On *Aster macrophyllus*. Laona.

Entyloma polysporum (Pk.) Farl. On *Rudbeckia hirta*. Athelstane.

Puccinia eatoniae Arth. A specimen of *Sphenopholis obtusata* in the herbarium bears this rust. It was collected by Lapham at Milwaukee.

Puccinia patruelis Arth. Aecia on *Lactuca spicata* collected at Laona are referred to this species.

Puccinia minuta Diet. On *Carex (trichocarpa?)*, Madison.

Puccinia obscura Schroet. Uredinia on old leaves of *Luzula saltuensis* in April. Merrimack.

Puccinia pruni-spinosae Pers. On *Prunus cuneata*. Millston.

Melampsora arctica Rostr. The uredinal stage has been collected on *Salix* at Princeton by M. W. Gardner and determined by J. C. Arthur. Uredinia and telia have also been collected on *Salix pedicellaris* and *S. discolor* at Solon Springs.

ADDITIONAL SPECIES

Not hitherto recorded as occurring in Wisconsin.

SYNCHYTRIUM CELLULARE n. sp.

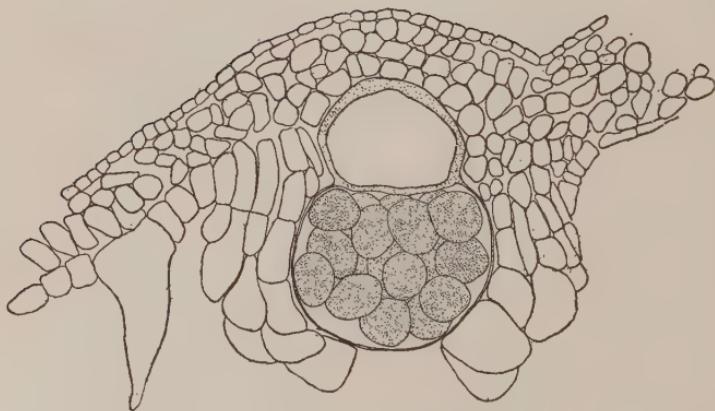
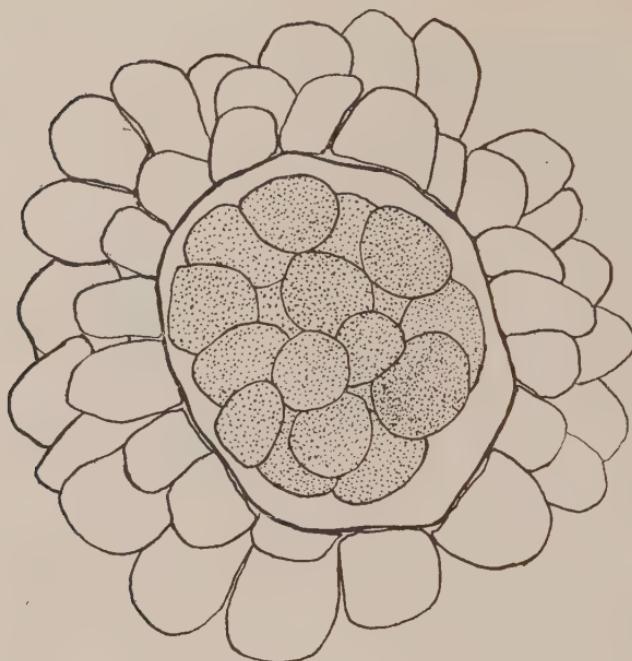
Galls of summer sporangia $130-240\mu$ wide \times $110-150\mu$ high, consisting of a central cell surrounded on the sides by smaller ($30-40\mu$) thin walled, superhemispherical cells which form an investment about two cells thick; central cell often divided by a horizontal septum into an empty basal cell and a larger upper cell which contains the summer sporangia; sporangia 30 or more, yellow, spherical to elliptical, $18-26 \times 15-22\mu$; resting spores globose to elliptical, brown, $50-90 \times 40-80\mu$, single in simple galls but little larger than the spores, and often at the base of the summer galls. Amphigenous on the leaves and on the petioles of *Boehmeria cylindrica*. This has been found only at the bottom of a kettle hole in the glacial drift at Devils Lake. It was first observed in 1913 on the few plants at the bottom of the kettle hole. In 1914 the quantity was less and in 1915 but a single infected leaf was seen which was not disturbed, but in 1916 no trace of the organism was found and careful search has not revealed it elsewhere. This recalls the career of *Doassansia ranunculina* Davis which was first collected in the early 90's. It increased in abundance and range year by year until it could be found wherever the host occurred in any direction within a radius of five miles or more from the city of Racine. In about ten years it suddenly disappeared and has not been seen since nor has it ever been reported from any other locality. I suspect that its extermination was due to freezing weather in late spring that killed the infected leaves.

Aphanomyces phycophila D By.

On *Spirogyra* spp. indet. Madison (E. M. Gilbert).

What is probably *Sphaeria solidaginis* Schw. has been collected on *Solidago altissima* at Petersburg and Gays Mills. The character of this production was discussed by Farlow in the *Bibliographical Index*, 270-1.

Phyllachora Wittrockii (Erikss.) Sacc. was collected in an immature condition on *Linnaea borealis americana* at Solon



Horizontal optical section of summer sorus of *Synchytrium cellulare* n. sp. (above) and vertical section of same (below).

Magnified 775 diameters; lower figure reduced.

Drawn by Mabel M. Brown with the aid of camera lucida.

Springs. Good specimens were collected on Isle Royale, Michigan, by Stuntz and Allen in 1901.

Exoascus mirabilis Atk. On *Prunus americana* (cult). Mountain. Collected also by Prof. L. R. Jones on wild plum trees at Albion and Edgerton. Some of the galls bear *Monilia* with conidia mostly about $15 \times 7-9\mu$.

Sporonema phacidoides Desm. (*Phyllosticta medicaginis* (Fckl.) Sacc.). On *Medicago sativa* (cult.) as well as the ascigerous stage, *Pyrenopeziza medicaginis* Fckl. Madison, (F. R. Jones.)

Phyllosticta ivaecola Ell. & Evht. On *Iva xanthifolia*. Dres-
ser Junction.

Asteroma tiliae Rud.

On *Tilia americana*. Bell Center.

Asteroma ribicolum Ell. & Evht. On *Ribes americanum*. Lake Mills, Madison and Gays Mills. It has also been observed in Kenosha county but always sterile whether on living leaves or on fallen leaves in the spring. Material wintered outdoors in a wire cage showed no further development in June.

Perhaps this is not distinct from the European *Asteroma umbonatum* Desm.

Stagonospora atriplicis (West.) Lind.

Of a collection on leaves of *Chenopodium (Blitum) capitatum* made at Laona July 14, 1915, the following characters were noted: Spots light brown, subcircular to irregular, 3-10 mm. in diameter; pycnidia epiphyllous, scattered, having a thin cellular wall which is hyaline below and black above especially about the large ostiole, $120-150\mu$ in diameter; sporules hyaline, oblong, straight, or sometimes curved, $15-21 \times 7-9\mu$, 1-3 septate. This I have referred to *Ascochyta chenopodii* (Karst.) Rostr.

A collection on the same species of host made at Sturgeon Bay by R. E. Vaughan, August 21, 1913, has smaller, paler spots, more uniformly colored pycnidia and sporules but $8-15 \times 2\frac{1}{2}-3\mu$ with one or occasionally two or three septa. This I have referred to *Septoria chenopodii* West. Ellis & Everhart N. A. F. 2nd series 3076 issued under the name *Septogloewum atriplicis* Desm. with *Phyllosticta atriplicis* given as a synonym is the same fungus. It seems not improbable that these are forms of a single species. [Since this was written I have observed that

Lind unites these, with other forms, under the name *Stagonospora atriplicis* (West.) Lind. (*Danish Fungi* 2387 p. 444.] Grove uses *Septovia chenopodii* West: for the group. (*Journ. of Bot.* 55: 348)

Stagonospora typhoidearum (Desm.) Sacc. On leaves of *Typha latifolia*. Mountain. Sporules 15–20 x 4–5 μ about 4-guttulate. Cytoplasm 1–3 times divided when treated with iodine. *Hendersonia typhae* Oud. which has been collected on *Typha* at Madison is perhaps parasitic.

Stagonospora dearnessii Sacc. On *Trifolium repens*. Madison and Athelstane. In these collections the sporules are 1-septate with occasional 2–3 septate ones. The young sporules contain 6–8 small guttulae which are larger and 4 in number when the septum is formed and probably disappear at maturity. I find the sporules to be uniformly triseptate when brought to germination. In the original description (*Stagonospora trifolii* Ell. & Dearn. *Phil. Acad. Sci.*, 1891, p. 82) the sporules are given as 2–4 nucleate but nothing is said of septa. Since this was written a collection has been made on *Trifolium hybridum* (Hixton, July 7–1916) with sporules 9–14 x 3 μ , uniseptate, rarely biseptate. They are somewhat fusoid while those that I have seen on *T. repens* are cylindrical or even somewhat narrowed in the middle. Of what I take to be a state of this fungus the following notes were made: Spots lethal brown, immarginate, elliptical to oblong or triangular, sometimes confluent, 3–10 mm. long, the long axis being parallel to the veins; pycnidia hypophylloous, scattered, succineous, widely open, about 100 μ in diameter; sporules mostly bacillary, 3–6 x 1–1 $\frac{1}{2}$ μ but occasionally ovoid, 2–3 x 1 $\frac{1}{2}$ μ . Oconto Co., June 25, 1915. It may be that *Phyllosticta trifolii* Rich. and *Phyllosticta Trifoliorum* Barbarine were founded upon something like this which I take to be a spermogonial condition very similar to *Sporonema phacidiooides* Desm. on *Medicago*.

Gloeosporium trifolii Pk. (See p. 674) and *Stagonospora dearnessii* Sacc. I take to be congeneric if indeed they are not more closely related as they may be to the following forms on clover that have been described: *Phleospora trifolii* Cav. with sporules 16–18 x 4–5 μ , continuous or with 1–3 indistinct septa and var. *recedens* C. Massal. 16–24 x 5–5 $\frac{1}{2}$ μ 1–3 septate; *Ascochyta trifolii* Siemaschko, 18–20 x 5–6 μ with one or rarely 2–3 septa; *Ascochyta trifolii* Boud. & Triouss. and *Ascochyta confusa* Bubak said by Jacewski to be probably conspecific with the foregoing; *Stagonospora trifolii* Fautrey, 16–22 x 3–4 μ ,

3-septate; *Stagonospora compta* (Sacc.) Died. (*Septoria compta* Sacc.) 15–25 x 4–5 μ , pluriguttulate or 4–5 septate. The economic importance of the clovers is such that we may anticipate that intensive work will be given to their diseases and the nomenclature may perhaps be allowed to rest until that is done.

Septoria sigmoidea Ell. & Evht. On *Panicum virgatum*. Lynxville. In these specimens the pycnidia are borne in long dead leaf areas. The sporules have a fuligenous tint and are little more than 3 μ thick.

Septoria glumarum Pass. On dead, rusted leaves of *Triticum vulgare* (cult.) Athelstane. Sporules 15–36 x 2 $\frac{1}{2}$ –3 μ , 1–3 septate as shown by staining. In a collection made at Independence July 29, 1916, the pycnidia are sometimes accompanied by perithecia that seem referable to *Sphaerulina*.

SEPTORIA NEMATOSPORA n. sp. Spots amphigenous, indeterminate, pale yellow becoming brown, 3–6 mm. long and of the width of the leaf, often confluent; pycnidia hypophyllous, intervenular, dark brown, ostiolate, globose to elliptical, 75–150 x 75–100 μ ; sporules filiform, somewhat curved, lax, continuous, eguttulate, 37–55 x 1 $\frac{1}{2}$ –1 μ . On leaves of *Carex pennsylvanica*. Ladysmith, Wisconsin, July 31, 1915. This was referred to in "Notes" III, p. 246. While examining the Ladysmith collection a pycnidium was observed which contained sporules 18–20 x 3–4 μ , 3-septate like those noted in the same reference.

Septoria anemones Desm. On *Anemone quinquefolia*. Racine. On longitudinal blackish brown areas associated with an immature Sphaeriaceous fungus.

On looking over some unidentified collections I find one on cultivated *Chrysanthemum* made at Racine May, 1894, by F. L. Stevens which I refer to *Septoria rostrupii* Sacc. & Syd. The spots are mostly green, the black, epiphyllous pycnidia about 90 μ in diameter and the sporules 42–48 x 1–2 μ , subflexuose. This is given as a synonym of *Septoria chrysanthemella* Cav. on the label of Vestergren's *Micromycetes rariores selecti* 1646.

Specimens from an elm in a city lot at Platteville bear *Sacidium ulmi-gallae* Kell. & Sw. They were sent by Mr. S. E. Livingston. The sporules are mostly oval to ovate, 6–9 x 4 μ . The host is *Ulmus fulva* and the accompanying galls are those caused by *Schizoneura americana* as I am informed.

MYRCOCONIUM COMITATUM n. sp.

On dead areas that often include the entire leaf. From a thin, pale, discoid stroma arise erect, simple, hyaline, crowded basidia, $10-15 \times 1-1\frac{1}{2}\mu$ on which are borne apical, globose, hyaline sporules $2-3\mu$ in diameter. These sporules exude in drop-like masses which dry on the surface of the leaf. The acervuli are usually nervisequent and variable in size sometimes exceeding 1 mm. in length. On *Populus tremuloides*. Mountain, Long Lake, Wausauke and Athelstane. On *Salix discolor*, Athelstane. On *Salix longifolia*, Suring. On *Populus* the acervuli are hypophyllous, on *Salix* epiphyllous. On *Populus tremuloides* this fungus was invariably associated with *Sclerotium bifrons* Ell. & Evht. The midribs of the attacked leaves of *Salix longifolia* are black. I am separating the form on *Salix* as var. *SALICARIUM* n. var.

What I take to be a microconidial state of *Marssonina castagnei* (D. & M.) Sacc. occurs also on *Populus tremuloides* in scattered groups having sporules about $4 \times 1\mu$.

There were collected on leaves of *Astragalus canadensis* at St. Croix Falls August 27th, 1914, specimens that have been filed in the herbarium under the name *Gloeosporium astragali* ad interim. The following notes were made: Spots circular, alutaceous, often zonate, about $\frac{1}{2}$ cm. in diameter; acervuli epiphyllous, yellowish, 150μ in diameter; sporules ovoid to oblong, hyaline, $4-8 \times 3\mu$. The sporules are much like those of *Gloeosporium davisii* Ell. & Evht. on fruit of *Vicia americana*. It was not abundant. No *Gloeosporium* was collected on any other host in the vicinity. I think it best to consider this as merely a herbarium name for the present.

Colletotrichum nigrum Ell. & Hals. On *Capsicum* (cult.) Milwaukee (R. E. Vaughan).

COLLETOTRICHUM SILPHII n. sp.

Spots definite, orbicular, light brown becoming cinereous, margin darker above, $\frac{1}{2}-1$ cm. in diameter, sometimes confluent; acervuli epiphyllous, scattered, little or not at all prominent, about 75μ wide; sporules hyaline, continuous, arcuate, acute at both ends, $22-27 \times 2\frac{1}{2}-3\mu$; setae brown black, sometimes subflexuose, occasionally bent, sometimes 1-2 septate, $36-75 \times 4\mu$. On leaves of *Silphium perfoliatum*. Lynxville, Wisconsin, Sept. 9, 1915.

CYLINDROSPORIUM EMINENS n. sp.

Spots suborbicular, brown usually with more or less of a reddish halo above, dark grey below, 1-2 mm. in diameter; acervuli epiphyllous, more or less prominent, $75-100\mu$ wide; sporules hyaline, straight or curved, becoming pluriseptate, $25-75 \times 2-3\mu$. On leaves of *Helianthemum canadense*. Solon Springs, Wisconsin, Sept. 7, 1914.

Septocylindrium caricinum Sacc. On *Carex grisea*. Blue Mounds.

Ramularia aromatica (Sacc.) Hoehn. (*Septocylindrium aromaticum* Sacc.). On *Acorus Calamus* in the experimental drug garden at Madison.

RAMULARIA LUCIDAE n. sp.

Spots orbicular to elliptical to angular, castaneous with a darker periphery and a raised margin, paler and more livid below, 3-6 mm. in diameter; conidiophores amphigenous but mostly hypophyllous, densely fasciculate, straight, hyaline, $20-40 \times 2-3\mu$; conidia cylindrical to fusoid-cylindrical, usually straight, hyaline, guttulate, occasionally showing a median division of the cytoplasm, $23-42 \times 2\frac{1}{2}-3\mu$. On leaves of *Salix lucida*. Laona, Wisconsin, July 12, 1915. This differs from *Ramularia rosea* (Fckl.) Sacc. in the fewer and more definite spots and the longer conidia.

Heterosporium gracile (Wallr.) Sacc. On *Iris* (cult.) Madison (H. W. Browning).

Cercospora nasturtii Pass. was collected on *Radicula Nasturtium-aquaticum* in the Fox river above Burlington in 1908.

CERCOSPORA SANICULAE n. sp.

Spots angular, limited by the veinlets, at first light sordid brown, 1-2 mm. in diameter, becoming confluent and blackish brown; conidiophores hypophyllous, scattered or in small fascicles of 2-4, straight, simple, continuous, or rarely with 1 or 2 septa, denticulate or subtorulose near the apex, brown, $15-45 \times 3\frac{1}{2}-6\mu$; conidia narrow obclavate, tapering from near the base, subolivaceous, indistinctly guttulate, straight or somewhat curved, $50-110 \times 3\frac{1}{2}-4\frac{1}{2}\mu$. On *Sanicula gregaria*. Gays Mills, Wisconsin, Sept. 15th, 1915.

RAMULARIA VARIATA n. sp.

Spots amphigenous, angular, limited in part by the veins, yellowish brown becoming black, $\frac{1}{2}$ – $1\frac{1}{2}$ cm. in diameter; conidiophores hypophyllous, fasciculate, hyaline, simple, straight or apical portion oblique, continuous or indistinctly septate, denticulate, 25 – 45 x $2\frac{1}{2}$ – 3μ ; conidia subapical, catenulate, hyaline, ovoid to fusoid to cylindrical, continuous or the longest 1-septate, 10 x 5 – 30 x 3μ . On *Monarda fistulosa*. Lynxville, Wisconsin, Sept. 3, 1915. This is very similar to *Ramularia lamicola* C. Massal. but in the absence of knowledge as to the cause of the resemblance I am considering the American form on *Monarda* as specifically distinct.

In Farlow's *Host Index* *Mentha canadensis* is given as a host of *Ramularia menthicola* Sacc. and in the provisional list collections on this host were recorded under that name. The Wisconsin specimens however as well as those collected in Montana by E. T. and E. Bartholomew and issued in *Fungi Columbiani* 4380 I am now referring to the species described above. They differ from *R. menthicola* Sacc. as described, in the character of the spots and in the shorter conidiophores. In the Montana specimens the spots apparently do not become black as they do in the Wisconsin ones. It may be that this is not distinct from *Ramularia lycopi* Hollos which I have not seen. A word as to the *Monarda* host: as it occurs in Wisconsin the under surface of the leaves bears very short (30 – 40μ), conical, erect hairs that form a pile that is somewhat velvety to the touch. With these are much longer white, pilose hairs that are usually few but in some specimens more abundant.

Cercospora depazeoides Sacc. On *Sambucus canadensis*. Grant County opposite Bridgeport.

Cercospora gentianicola Ell. & Evht. On *Halenia deflexa*. Solon Springs. The following notes were made from this collection: Spots dark, indefinite, becoming confluent; conidiophores hypophyllous or epiphyllous, fasciculate from small black stromatic tubercles, fuligenous to dark brown, straight or more often more or less flexuose, continuous, entire or denticulate, 10 – 40 x 3 – 4μ ; conidia hyaline, obclavate-cylindrical, straight or curved, becoming tri-septate, 40 – 72 x 3 – 5μ . I take *Cercospora gentianae* Pk. to be a synonym.

Cercospora crassa Sacc. On *Datura Stramonium* and *Datura Metel* and other species in the experimental drug garden at Madison. The type of *Cercospora daturae* Pk. was collected in June and appears to be a somewhat immature condition of the same fungus. In the Madison material zonation of the spots is conspicuous and vertical septa in the conidia are well developed and the fungus should be referred to *Alternaria* [This is *Alternaria crassa* (Sacc.) Rands. *Phytopathology* 7:337].

Macrosporium saponariae Pk. which occurs in Wisconsin on leaves of *Saponaria officinalis* has not been recorded in any of the state lists of parasitic fungi.

Ustilago violacea (Pers.) Fckl. was reported in the 4th supplementary list but was unintentionally omitted from the provisional list. It has been collected at Racine, Madison, and in Kenosha county in the anthers of *Arenaria lateriflora*.

Puccinia uniporula Orton. On *Carex gracillima*. Racine.

Puccinia karellica Tranz. On *Carex paupercula irrigua*. Price and Sawyer counties.

The above species on *Carex* were determined by Dr. J. C. Arthur.

SCLEROTIUM DECIDUUM n. sp.

Mycelium hypophyllous, white, branched, continuous (?) 3-4 μ in diameter, at first effused but soon aggregated into rounded masses 0.1-3 mm. in diameter. The larger of the mycelial masses become compacted into grey, globose to elliptical sclerotia about 2 mm. in diameter which usually fall away before mature. The affected leaf areas become pale and dead and usually studded with brown dots that mark the location of the mycelial ganglia. This was referred to in the supplementary list of parasitic fungi of Wisconsin, No. 495, as occurring on "Silphium, *Helianthus*, etc." at Racine. The following hosts are represented by specimens in our herbaria: *Adiantum pedatum*, *Pteris aquilina*, *Aralia nudicaulis*, *Mitella diphylla*, *Diervilla Lonicera*, *Steironema ciliatum*, *Solidago "canadensis,"* *Silphium terebinthinaceum*. The paucity of specimens is because of falling away of the sclerotia.

UNIVERSITY OF WISCONSIN HERBARIUM,
MADISON, WISCONSIN, APRIL, 1916.

44—S. A. L.

NOTES ON PARASITIC FUNGI IN WISCONSIN—V.

J. J. DAVIS.

Plasmopara humuli Miyabe & Takahashi which has been reported as occurring in Racine and Crawford counties was found in 1916 in Monroe County also. It appears to be indigenous to Wisconsin.

R. E. Stone has described *Mycosphaerella aurea* n. sp. as the ascogenous stage of *Septoria aurea* Ell. & Evht. (*Phytopath.* 6: 424.)

Hendersonia typhae Oud. is referred to *Scolecosporium* by von Hoehnel (*Fragm. zur Mykol.* no. 268).

Septoria salicina Pk., as I understand it, appears first as small scattered round or subangular black spots which increase in size (2-5 mm.) and more or less of the central portion becomes grey and arid. In this central portion the few hypophylloous pycnidia appear. The deeply lying ones are globose but those that impinge upon the unyielding epidermis of the host are flattened thereby so that sometimes they resemble acervuli. The sporules are arcuately curved, acute, 25-52 (mostly 30-45) x 2-3 μ . They have usually a single median septum but some of the longer ones have 2 or 3 or even 4. I have seen this in Wisconsin on *Salix lucida* only and the herbarium specimens are on this host or on *Salix Fendleriana* except *North American Fungi*, 2nd series 3064 which is labeled *Salix cordata*. *Fungi Columbiani* 3872 bears much larger zonate spots due perhaps to the unusual thinness of the leaves of the host. *Gloeosporium boreale* Ell. & Evht. (*N. Am. Fungi* 3279) appears to be a small spored form of the same fungus. *N. Am. Fungi* 2nd series 3472 issued as *Septogloeum salicinum* (Pk.) Sacc. does not seem to differ from *Septoria albaniensis* Thuem.

which, in the provisional list was included in *Septoria salicina* Pk. as a short spored form. *Fungi Columbiani* 3872 issued as *Septogloeum salicinum* (Pk.) Sacc. I would refer to *Septoria salicina* Pk. although as noted above the spots are much larger. *N. Am. Fungi* 2nd series 3064, *F. Col.* 3779 & 4387 I would refer also to this species. They were issued as *Septoria salicis* West. which I have not seen but with the description of which the American specimens do not agree in any respect. None of the specimens that I have examined bear sporules as long as is indicated in the description unless they are measured along the curve. In type material the longest sporule that I saw was 52 μ in a straight line connecting the extremities.

[See Dearnness, *Mycologia* 9:359].

Gloeosporium cylindrospermum (Bon.) Sacc. which was recorded as occurring on *Alnus incana* in Wisconsin in "Notes" II is referred to *Leptothyrium alneum* (Lev.) Sacc. by Diedieke (*Krypt. fl. M. Brandenburg, Pilze* 7: 707-8). Klebahn has shown its connection with *Gnomoniella tubiformis* (Tode) Sacc.

A fungus on *Acer Negundo* collected at Whitehall on samaras and leaves and referred to *Gloeosporium apocryptum* Ell. & Evht. bears sporules 12-15 x 5-6 μ .

Pestalozzia kriegeriana Bres. is placed in the genus *Hyaloceras* by Diedieke (*Krypt. fl. M. Brand.*: *Pilze* 7: 877).

In the provisional list *Ramularia modesta* Sacc. was recorded as occurring in Wisconsin on *Fragaria virginiana*. The reference to this species was because of the small size of the conidia. In July, 1916, a collection was made on *Fragaria virginiana* at Whitehall from examination of which the following notes were made: Spots suborbicular to angular, brown, paler below, immarginate, 5-8 mm., sometimes confluent; conidiophores hypophylloous, fasciculate from a black stromatic base, straight, simple, septate, tapering upward, olivaceous-brown, 45-75 x 3 μ ; conidia hyaline, catenulate, 5-11 x 1 $\frac{1}{2}$ x 2 $\frac{1}{2}$ μ . The entry in the provisional list was based on specimens collected at Spooner and on referring to them I found the following notes in one of the packets: "Hyphae hypophylloous, olivaceous-brown, rigid, 40-70 x 4 μ ; conidia hyaline, obtuse, catenulate, 6-12 x 2-3 μ . *Cercospora vexans* C. Massal?" The reference to that species

seems warranted by the description and I have so labeled the specimens. *Ramularia modesta* Sacc. should therefore be elided from the list.

The fungus on *Aster* given in the provisional list as *Ramularia asteris* (Trel.) Barth. appears to be conspecific with *Fusidium* (?) *Asteris* Phil. & Plowr. (*Grevillea* 6:23) which has been referred to *Ramularia* by Bubak (*Ann. Mycol.* 6:27). The name should therefore be written *Ramularia asteris* (Phil. & Plowr.) Bubak, as is done by Vestergren in *Micromycetes rariores selecti* 1094 except that he followed Saccardo and Bubak in transposing the names of the authors of the specific name.

By some oversight *Urocystis anemones* (Pers.) Schroet. was omitted from the provisional list. I am indebted to Professor J. G. Sanders for calling my attention to the omission. The smut is common on *Hepatica triloba*, *H. acutiloba* and *Anemone quinquefolia* and was reported by Trelease in the preliminary list as occurring on *Anemone canadensis*.

Aecia of *Uromyces* were collected on *Trifolium pratense* and *T. hybridum* at Madison by W. H. Davis. They have also been collected on the latter host at Melvina.

Puccinia bartholomaei Diet. was included in the provisional list because of an *Aecidium* on *Asclepias syriaca* which occurs in the state which proves however to be connected with *Puccinia seymouriana* Arth. instead. (Arthur, *Mycologia*, 8:134). My observations both at Racine and Madison lead me to believe that this rust may overwinter on *Spartina* probably as mycelium.

Specimens of the *Roestelia* stage of *Gymnosporangium globosum* Farl. on *Crataegus* collected at Maiden Rock and St. Croix Falls in 1916 have peridial cells but 40-60 μ long. Perhaps the dwarfing was due to the unusually hot weather.

Peridermium comptoniae (Arth.) Orton & Adams was observed in June 1916 at Millston in Jackson County. Its presence is most easily detected after a rain when the fresh sori appear. I find it usually on the east side of the trunk near the base. In this region rain is usually preceded by easterly winds hence the fresh sporidia are most likely to be lodged on the east

side of the trunk when moisture conditions are favorable for infection. After a rain the basal portion of the trunk remains moist long after the higher portions have dried off. This has since been collected in Adams and Juneau counties and its range in Wisconsin probably approximates that of the host *Pinus Banksiana*.

Peridermium pyriforme Pk. was collected during the same month at Melvina, Monroe County, and at Millston. As usual, in my experience in collecting this rust, but a single specimen was found in each locality.

ADDITIONAL HOSTS

A very scanty development of *Bremia lactucae* Regel was observed at Arcadia on *Krigia amplexicaulis*.

Plasmopara halstedii (Farl.) Berl. & De Toni on *Artemisia ludoviciana*. Taylor.

Peronospora potentillae D By. On *Agrimonia striata*. Arcadia.

Peronospora rubi Rabh. On *Rubus hispida*. Millston. But little of the mildew was seen on this host.

Uncinula macrospora Pk. On *Ulmus racemosa*. St. Croix Falls.

Taphrina coerulescens (Desm. & Mont.) Tul. On *Quercus macrocarpa*. Granville. (I. A. Lapham, 1867.)

Phyllosticta decidua Ell. & Kell. On *Agrimonia gryposepala*. Arcadia. Sporules $4-5 \times 2\frac{1}{2}-4\mu$, fuligenous tinted.

Ascochyta wisconsina Davis. On *Sambucus racemosa*. Lynxville.

Diplodia uvulariae Davis. On *Uvularia grandiflora*. Maiden Rock. This collection bears mostly pycnidia containing sporules $4-5 \times 1\mu$ which I take to be a spermogonial state. The *Diplodia* is immature, the sporules being still hyaline and but few of them septate.

Septoria graminum Desm. On leaves of *Bromus altissimus*.
Maiden Rock.

Septoria polygonorum Desm. On *Polygonum pennsylvanicum*.
Lynxville. Sporules up to 60μ long.

Septoria lepidiicola Ell. & Mart. On leaves of *Lepidium apetalum*. Sparta.

Septoria solidaginicola Pk. On *Aster azureus*. Danbury.

In "Notes" III p. 259, reference was made under *Gloeosporium caryae* Ell & Dearn., to an epiphyllous form on *Carya cordiformis* and I find a collection of the same kind made at Richland Center on *Carya alba* by R. A. Harper & G. M. Reed. This is *Phyllosticta caryae* Pk. but in both the Wisconsin and New York material the sporules arise from a subcuticular stroma.

Colletotrichum lagenarium (Pass.) Ell. & Hals. On *Cucurbita Melo* (cult.) Madison. On *Cucumis sativus* (cult.) Princeton (M. W. Gardner.)

Cylindrosporium vermiforme Davis. On *Corylus rostrata*. Cameron. A collection of this fungus from Danbury shows globose swellings up to 20μ in diameter in the continuity of the conidia. These vesicles are rich in cytoplasm and suggest chlamydospore formation.

Ramularia desmodii Cke. On *Desmodium paniculatum*.
Maiden Rock.

Ramularia lysimachiae Thuem. On *Steironema lanceolatum*.
Lynxville.

Cercospora circumscissa Sacc. On *Prunus pennsylvanica*.
Neopit and Blair. On *Prunus serotina*. Athelstane and Alma.

Entyloma australe Speg. On *Physalis pubescens*. (cult.)
Waupaca. (R. D. Rands).

Entyloma polysporum (Pk.) Farl. On *Ambrosia trifida*.
Maiden Rock. Forming definite, orbicular, yellow, somewhat thickened spots about 5 mm. in diameter.

Uromyces proeminens DC. On *Euphorbia dentata*. Lynxville. This is *U. poinsettiae* Tranz.

Puccinia coronata Cda. On *Cinna arundinacea*. Luck.

Puccinia graminis Pers. On *Bromus secalinus*. Independence.

Puccinia koeleriae Arth. Aecia (*Aecidium liatridis* Ell. & And.) on *Liatris scariosa*. Solon Springs, Millston and Hixton and in small quantity on *Liatris cylindracea* at Millston. Uredinia and telia on *Koeleria cristata* Millston. In the description the aecial host was given as *Mahonia* but Bethel has established the connection here given.

Puccinia patruelis Arth. Uredinia and telia on *Carex siccata*. Black River Falls. Field observation indicated that the aecia connected with this collection were borne on *Krigia amplexicaulis*.

ADDITIONAL SPECIES

Plasmopara acalyphae G. W. Wilson.

Because of the discovery of a trace of this mildew *Acalypha virginica* was interrogatively given as a host of *Peronospora euphorbiae* Fckl. in the provisional list. As stated in "Notes" II (1914) but a single additional conidiophore had been found up to that time. In 1915 however, enough was secured to show that it is an undescribed species of *Plasmopara* and it was sent to Prof. Guy West Wilson, who has given special attention to the *Peronosporales*, for description and publication. In 1916 still further material was secured. [See *Mycologia* 10:169.]

In "Notes" III, p. 252, mention was made of a *Lophodermium* on *Pinus Banksiana* differing from *L. pinastri* (Schrad.) Chev. A number of collections of this were made in 1916 which show that it is constant and distinct, differing from *Hypodermella*, as characterized by Lagerberg, only in the broad perithecia.

LOPHODERMUM AMPLUM n. sp.

On sordid spots or terminal leaf areas; perithecia amphigenous, prominent, black, elliptical, $\frac{1}{2}$ –1 mm. long; asci cylindrical to clavate-cylindrical, narrowed at the apex, sometimes

curved, 90–165 x 18–30 μ ; spores embedded in mucus, overlapping, hyaline, continuous, attenuate at base, clavate-cylindrical, rarely fusoid-cylindrical, 30–72 x 3–6 μ ; paraphyses numerous, filiform, a little longer than the asci. On leaves of *Pinus Banksiana*. Muscoda, Sparta, Millston, Black River Falls, Taylor, Gordon. May to July. *Lophodermium pinastri* (Schrad.) Chev. occurs on this host in Wisconsin, on dead, fallen leaves, while *L. amplum* develops on leaves that are, in part, living or that are *in situ*. What relation this bears to the *Hypoderma desmazieri* Duby reported by Peck as occurring on leaves of *Pinus rigida* in New York I do not know.

Lophodermium lineare Pk. On *Pinus Strobus*. Pembine.

Coccochora rubi sp. nov. Stromata epiphyllous, scattered, black, shining, prominent, suborbicular, subcuticular, $\frac{1}{4}$ –1 mm. in diameter; loculi one to several, 45–60 μ high, 60–90 μ wide, opening at the apex; asci cylindrical, more or less curved, 45–50 x 7–9 μ , octosporous; spores brown, clavate-oblong, with a single septum which is more or less submedian, not constricted, 11–15 x 4–6 μ ; paraphyses filiform, inconspicuous. On leaves of *Rubus hispida*, Millston, Wisconsin, August 19, 1915, and July 19, 1916. Small stromata containing but a single locule are subhemispherical, the larger compound ones, which are sometimes circinate, are tuberculate. The adnate clypeus is large and merges into the normal cuticle at the edge. This fungus suggests *Asterina rubicola* Ell. & Evht. when seen in the field.

In the provisional list hosts were not enumerated under *Phyllachora graminis* (Pers.) Fckl. In *Annales Mycologici* 13:436 et seq. Theissen and Sydow have divided this into a large number of species. More knowledge of their biological relations is needed for a satisfactory classification of the North American forms. It may be of service to give some notes of measurements of asci and spores taken from Wisconsin specimens.

Elymus: Asci 66–75 x 6–7 μ ; spores 8–9 x 4 $\frac{1}{2}$ –6 μ . Theissen & Sydow take a specimen on this host genus as the type of *Phyllachora graminis* (Pers.) Fckl. with characters with which these measurements agree except that the asci of the type are thicker (8–10 μ).

Hystrix patula: Asci 66–79 x 6–9 μ ; spores 8–12 x 5–6 μ . This

seems to be so like the form on *Elymus* as to indicate specific identity. There is a *Phyllachora asprellae* Roum. & Fautr. in France the ascospores of which are described as being larger.

Panicum latifolium: Ascospores 65–80 x 9 μ ; spores 8–9 x 4–5 μ . A later collection: Ascospores 60–70 x 8–12 μ ; spores 9–11 x 5–6 μ .

Panicum huachucae: Ascospores 50–60 x 6–9 μ ; spores 8–9 x 4–5 μ .

Panicum sp. indet.: Ascospores 57–63 x 9 μ ; spores 7–9 x 5 μ . The *Panicum* specimens appear conspecific and are what has been distributed in this country as *Phyllachora graminis* var. *panici* (Schw.) Shear. If they belong with any of the species described by Theissen & Sydow as occurring on *Panicum* it is probably the South American *Phyllachora panici* (Rehm).

Muhlenbergia: Ascospores 50–67 x 5–6 μ ; spores 6–8 x 4 μ . This is probably *Phyllachora vulgata* Theiss. & Syd. (loc. cit. 450).

Agropyron repens: Ascospores 60–80 x 6–8 μ ; spores 8–12 x 4–5 μ .

Calamagrostis canadensis: Ascospores 51–72 x 5–6 μ ; spores 7–9 x 5–6 μ . *Phyllachora* has been observed in northern Wisconsin on *Oryzopsis asperifolia* but no mature specimens have been preserved. This is presumed to be *Phyllachora oryzopsis* Theiss. & Syd. (loc. cit. 451).

Taphrina coryli Nishida. On leaves of *Corylus americana*. McFarland, Madison, Sparta, Melvina, Hixton, Taylor, Blair, Whitehall. In 1916 this was found scattered about through the woods in western Wisconsin in a way that left no room for doubt as to its being indigenous. The appearance in the field suggests *Microsphaera*.

Of a collection on leaves of *Echinocystis lobata* made at Whitehall, July 28, 1916, the following notes were made: "Spots suborbicular, immarginate, pale brown, 1/2–1 cm. in diameter; pycnidia scattered, lenticular, succineous, ostiolate, 75–100 μ ; sporules hyaline, oval to oblong, 4–8 x 1 1/2–3 μ . Accompanying *Plasmopara australis* (Speg.) Swingle and perhaps secondary." I have referred it to *Phyllosticta orbicularis* Ell. & Evht.

Sphaeropsis betulae Cke. var. *FOLIICOLA* n. var. On large, light brown dead leaf areas; pycnidia mostly epiphyllous, scattered or aggregated, blackish brown, depressed-globose, blackened about the ostiole, 100–150 μ ; sporules oblong with rounded

ends, usually straight, continuous, fuligenous to brown, 18-24 x 9 μ . On leaves of *Betula alba papyrifera*. Maiden Rock, Wisconsin, August 5th, 1916.

Ascochyta graminicola Sacc. On leaves of *Calamagrostis canadensis*. Maiden Rock. Of this collection the following notes were made: Spots definite, sordid white, purple bordered, oval to oblong, 5-8 mm. long, sometimes confluent; pycnidia numerous, depressed-globose, wall thin, parenchymatous, ostiole surrounded by a black ring, about 120 μ in diameter; sporules hyaline, fusiform, acute, at both ends, uniseptate, 15-20 x 2 $\frac{1}{2}$ -3 μ . The sporules resemble those of *Darluca filum* (Biv.) Cast.

Specimens on *Actaea rubra* collected at Blair, July 17, 1916, have the following characters: On indefinite, blackened, dying, areas of the leaves the cuticle on the upper surface of which is sometimes wrinkled in dendritic lines; pycnidia mostly epiphyllous, scattered, amber colored, globose, about 100 μ in diameter; sporules hyaline, cylindrical, uniseptate, 17-24 x 5-6 μ . The pycnidial wall is at first hyphal but at maturity consists of a single layer of flat polygonal cells and is not thickened around the ostiole. This appears to be *Actinonema actaeae* (Allesch.) Died. *Stagonosporopsis actaeae* (Allesch.) Died. and probably *Marsonia actaeae* Bres. which is *Marssonina actaeae* (Bres.) Magn. It differs from *Ascochyta clematidina* Thuem. in the size of the sporules as the latter does from the form on *Thalictrum* that I have called var. *thalictri* (Trans. Wis. Acad. 16: 557). I have labeled the specimen *Ascochyta actaeae* (Bres.) n. comb. These three forms are so similar that it seems to me that it would be proper to indicate the fact by grouping them in a single species. On *Thalictrum* the sporules are 8-10 x 2-3 μ , on *Clematis* 10-15 x 3 μ , on *Actaea*, 17-24 x 5-6 μ . Such series on the same or on related hosts seem to be not uncommon, but there appears to be no way in the present state of taxonomy to indicate the relationships by grouping them, especially as increased spore length often brings increased septation and thereby passes generic limits as now understood.

Ascochyta imperfecta Pk. On *Medicago sativa* (cult.) Madison. Sporules 8-11 x 3-3 $\frac{1}{2}$ μ .

Ascochyta cucumis Fautr. & Roum. On *Cucumis sativus* (cult.) Platteville. (E. Carsner, com. M. W. Gardner.)

There are in Wisconsin a number of foliicolous *Sphaeriodaceae* that constitute a definite group as seen in the field. They cause blackish brown spots of subcircular form but irregular outline with more or less black crustaceous thickening of the upper surface. The pycnidia are innate, inconspicuous, few, scattered, pale, thin walled with the ostiole directed toward the upper surface of the leaf, 100–150 μ in diameter and can often be distinguished with a strong hand lens and good transmitted light, especially if the leaf is wet. The sporules are cylindrical with rounded ends and septate. It is in the size and septation of the sporules that variation occurs. What the relation of these forms to each other may be is for the future to disclose through field observation and artificial infection. In the meantime some means of designation is needed and I have tentatively arranged them as follows:

Stagonospora apocyni (Pk.?) n. comb. Spots definite, immarginate, subcircular, reddish brown, somewhat paler below, 1–2 cm. in diameter; pycnidia few, scattered, epiphyllous-innate, globose, succineous, thin walled, becoming more or less thickened and blackened about the ostiole; sporules hyaline, fusoid-cylindrical, 3–7 septate with a large droplet in each cell, 33–50 x 6 μ . On leaves of *Apocynum androsaemifolium*. This is the fungus recorded under the name *Septogloewum apocyni* Pk. in the provisional list. The material at hand of that species, on *Apocynum cannabinum* does not enable me to determine whether that is also a *Stagonospora*. Certainly the sporules are similar.

Next comes a form on *Cirsium*.

STAGONOSPORA CIRSI n. sp.

On circular brown or cinereous spots, often with a whitened center 1/2–1 cm. in diameter or on large brown areas; pycnidia few, scattered, innate, depressed-globose, brown, ostiolate, 125–150 μ in diameter; sporules cylindrical, ends rounded, straight or slightly curved, hyaline, 2–5 septate, not constricted, 20–32 x 5–6 μ . On *Cirsium altissimum*. Maiden Rock, Wisconsin, August 7th and 16th, 1916.

Next is *Ascochyta lophanthi* Davis (Trans. Wis. Acad. 14:95) on *Agastache scrophulariaefolia* with uniseptate sporules 20–30 x 10–12 μ .

var. *OSMOPHILA* n. var.

Spots like those of the type; sporules uniseptate $12-21 \times 3-5\mu$. On *Agastache Foeniculum*. Danbury.

var. *LYCOPINA* n. var.

Spots suborbicular to angular, blackish brown above, lighter below, immarginate, 3-10 mm. in diameter; pycnidia few, scattered, innate, ostiole directed toward the upper surface of the leaf, very inconspicuous; sporules hyaline or smoky tinged, cylindrical with rounded ends, uniseptate, $16-24 \times 7-8\mu$. On *Lycopus uniflorus*. Shiocton, Wisconsin, August.

Collections on *Sanicula marilandica* having uniseptate sporules $20-30 \times 4-6\mu$ were described in *Trans. Wis. Acad.* 18¹:105, under the name *Ascochyta saniculae* n. sp. The affected leaf areas are usually larger and less definite in the form on this host. This has also been collected on *Zizia aurea* at Melvina. On this host definite orbicular to elliptical olivaceous spots $1\frac{1}{2}-1$ cm. long occur. Both of these probably should be referred to *Ascochyta thaspiae* Ell. & Evht. the sporules of which were described as being $25-30 \times 6-8\mu$. In the Wisconsin specimens on *Zizia* the sporules are $18-25 \times 4-6\mu$ and are perhaps immature.

Next comes a form that may be designated

ASCOCHYTA COMPOSITARUM n. sp. Forming large indefinite brown areas and also smaller more definite spots about 1 cm. in diameter; pycnidia as in the previously mentioned forms; sporules hyaline, uniseptate, $15-22 \times 4-6\mu$. On *Eupatorium urticaefolium*, *Helianthus strumosus* and *Aster Drummondii*. Of one specimen on the former host it was noted "sporules not well developed, $12-16 \times 3-4\mu$."

Var. *PARVA* n. var.

Character of the species except that the sporules are but about $10-15 \times 2\frac{1}{2}-3\frac{1}{2}\mu$, uniseptate. On *Helianthus strumosus*. Maiden Rock.

It is probable that this species occurs upon other Composites and that *A. thaspiae* E. & E. will be found on other *Umbelliferae*. Indeed I have seen the latter on *Cicuta maculata* but did not secure enough for a specimen.

Ascochyta treleasei Sacc. & Vogl. the types of which were collected in Wisconsin on *Silphium* and *Vernonia* I have not

seen but the small spots and proportionately broader sporules described have deterred me from referring these collections to that species.

STAGONOSPORA ZONATA n. sp. Spots orbicular, clay colored with concentric dark lines, $1\frac{1}{2}$ –2 cm. in diameter; pycnidia few, epiphyllous-immersed, depressed-globose, honey color, ostiolate, 120 – 180μ in diameter; sporules oblong to cylindrical, hyaline, 4-guttulate becoming 3-septate, not constricted, 12 – 25 \times $3\frac{1}{2}$ – 6μ . On living leaves of *Asclepias syriaca*. Independence, Wisconsin, July 29, 1916; Arcadia, Wisconsin, July 31st, 1916. Perhaps this is a better developed state of *Ascochyta asclepiadis* Ell. & Evht.

Septoria mitellae Ell. & Evht. On “*Mitella* or *Tiarella*.” Merrimack. Name of collector not given.

Septoria stachydis Rob. & Desm. On *Stachys tenuifolia*. Melvina.

Septoria krigiae Dearn. & House. Spots definite, suborbicular, reddish brown, paler in the center, 3–8 mm.; pycnidia epiphyllous, scattered, black, prominent, 50 – 75μ ; sporules hyaline, straight or sometimes curved, 18 – 27 \times $3\frac{1}{4}$ – 1μ . On leaves of *Krigia amplexicaulis*. Arcadia.

CYTODIPLOSPORA ELYMINA n. sp. Pycnidia in the loculi of *Phyllachora*, spherical to elliptical, 100 – 135μ ; sporules oblong, hyaline, often 4-guttulate, becoming uniseptate, 7 – 10 \times $2\frac{1}{2}$ – 3μ . On leaves of *Elymus virginicus*. Madison. This is doubtless a spermogonial state of the *Phyllachora*.

Gloeosporium leptospermum Pk. On *Pteris aquilina*; accompanying *Phyllachora*. Whitehall. The longest sporules attain 30μ and the thickest 5μ .

Colletotrichum circinans (Berk.) Vogl. Reported as occurring on onion bulbs in Wisconsin. (J. C. Walker)

Marssonina rubiginosa Ell. & Evht. On *Salix* sp. *indet.* Madison.

Monilia corni Reade. On petioles, midribs and peduncles of *Cornus paniculata*. Melvina. The fungus is apparently locally abundant on this species of host but I found conidia but once.

Ovularia rigidula Delacr. On *Polygonum erectum*. Black River Falls and Sechlerville.

In the Wisconsin collection I find the conidiophores 24-70 x 3-4 μ . *Ovularia avicularis* Pk. does not seem to be separable. I find amphigenous conidiophores on European material (Jaap, *F. selecti exsic.* 291).

RAMULARIA DISPAR n. sp. On small indeterminate leaf areas which become yellowish and finally dead and brown; conidiophores hyaline, lax, mycelioid, often ascending the trichomes; conidia lateral in branched chains, hyaline, cylindrical, subacute, becoming 1-3 septate, 18-33 x 2 $\frac{1}{2}$ -3 $\frac{1}{2}$ μ . On leaves of *Eupatorium purpureum*. Danbury, Wisconsin, August 30, 1916. This is of the aberrant character of *Cercospora trichophila* Davis and suggests *Sporotrichum* in habit.

CLADOSPORIUM HUMILE n. sp. Spots dark reddish brown above, plumbeous below, suborbicular to polygonal, 2-10 mm. in diameter, sometimes confluent; conidiophores epiphyllous, most arising from small black pseudostromata of loose texture, erect or assurgent, dark brown, usually septate and often constricted at the septa, straight, flexuous or geniculate, 10-35 x 3-5 μ ; conidia fuligenous, catenate, oblong to fusoid-cylindrical, usually straight, becoming, in part at least, uniseptate, 15-37 x 4 μ . On leaves of *Acer rubrum*. Luck, Wisconsin, August 25, 1916. The spots appear to be made up of small black intervenular areas some of which are apparent at the periphery and others altogether detached. It may be that this fungus is secondary. [This has since been collected on *Acer saccharinum* at Plover and Arcadia].

Cercospora velutina Ell. & Kell. On *Baptisia leucantha*. Lynxville. In these specimens the conidiophores are borne on the lower surface of orbicular spots 3-10 mm. in diameter which are sometimes confluent and the tubercles are scarcely present. The conidiophores are 30-60 x 2-3 μ , fasciculate from a stromatic base and usually somewhat curved.

Cercospora longispora Pk. On *Lupinus perennis*, Millston.

Cercospora polytaeniae Ell. & Kell. On *Polytaenia Nuttallii*. Sparta. The conidiophores of this species were described as "very short." In this collection I find them 30-60 x 5 μ , flexuous

or geniculate, becoming denticulate and developing one or two septa.

Alternaria sonchi Davis. Parasitic on leaves of *Sonchus asper*. Madison. The description was published by John A. Elliott in the *Botanical Gazette*, 62: 416 (1916).

Uromyces murrillii Ricker. The aecial stage, *Aecidium houstoniatum* Schw., has been collected on *Houstonia longifolia* at Solon Springs and Millston but the further stages on *Sisyrinchium* have not yet been detected in Wisconsin. This is *Uromyces houstoniatus* J. L. Sheldon, a name that violates the rule that I am following.

Uromyces striatus Schroet. Uredinia on *Medicago sativa* (cult.) Weirgor. (F. R. Jones).

Puccinia eriophori Thuem. Following field observations by Dr. House it has been shown by Dr. Arthur by means of inoculation that the rust on *Eriophorum* is distinct from that on species of *Scirpus* and known as *Puccinia angustata* Pk. and that it develops aecia on *Senecio*. Aecia on *Senecio aureus* have been collected in widely separated localities in Wisconsin and Dr. Arthur reports a collection of the rust on *Eriophorum virginicum* at Elm Grove by Dr. C. L. Shear.

Cronartium ribicola Fisch. de Waldh.. The dreaded white pine blister rust has been found on *Pinus Strobus* in Polk County. Specimens of the aecial stage were collected by Moody, Sanders & Pierce in May, 1916, and Professor J. G. Sanders kindly furnished specimens of uredinia on *Ribes cynosbati* collected in June.

Aecidium uvulariae Schw. On *Oakesia sessilifolia*. Melvina and Hixton. I suspect that this is not distinct from *Aecidium majanthae* Schum. and that it is connected with *Puccinia sessilis* Schneid.

In the 3rd supplementary list (Trans. Wis. Acad. 14: 92) reference was made to the occurrence of a *Doassansia* on *Sagittaria heterophylla* that was referred to *Doassansia sagittariae* (West.) Fisch as forma *confluens* with the statement that it appeared to be physiologically distinct which opinion has been supported by subsequent observation. Morphologically, however,

I am not able to distinguish it from forms on *Sagittaria latifolia*, *S. arifolia* and *S. sagittifolia* with crowded and distorted sori. In the summer of 1916 collections were made of what proved to be a quite different type on *Sagittaria heterophylla*.

DOASSANSIA (DOASSANSIOPSIS) FURVA n. sp.

Spore balls in the leaf blades, loosely clustered, discrete, brown-black, spherical to oval, $100-150\mu$ long; spores in a single layer surrounding the sterile parenchymatous central portion, rounded-cuboidal, $8-10\mu$ long; cortical cells inconspicuous, plano-convex to flattened, $6-9\mu$ wide by $1-3\mu$ high. In leaves of *Sagittaria heterophylla*. Arcadia, Wisconsin, July 31st and August 2nd, 1916. This differs from *Doassansia martianoffiana* (Thuem.) Schroet. in the darker color, habitat and probably in the absence of conidia; from *D. deformans* Setch. in the much darker sori, part of the host attacked and in not causing hypertrophy. In color and to some extent in structure it recalls *Doassansia zizaniæ* Davis (Bot. Gaz. 26:353) which was referred to *Sclerotium* in the provisional list and suggests that that is also a member of this group.

UNIVERSITY OF WISCONSIN HERBARIUM,

MADISON, WISCONSIN, APRIL, 1917.

NOTES IN PARASITIC FUNGI IN WISCONSIN—VI

J. J. DAVIS.

A provisional list of parasitic fungi in Wisconsin was published in the Transactions of the Wisconsin Academy of Sciences Arts and Letters 17²: 846–984 [1914]. Notes bearing a supplementary relation thereto were issued through the same medium: 18¹: 78–109 and 251–271 [1915]: 19:

In the provisional list *Urophlyctis major* Schroet. was given as occurring on *Rumex verticillatus*. All of the Wisconsin specimens appear to be on *R. Britannica*.

Peck should be cited as the author of the binomial *Phyllosticta hamamelidis*, not Cooke as given in the provisional list.

The merging of *Marssonina castagnei* (Desm. & Mont.) Magn. with *M. populi* (Lib.) Magn. by Lind (*Danish Fungi*, 2761) did not surprise me and I am now using the latter name, instead of the former.

The classification of *Septoria* on *Solidago*, *Aster* and *Erigeron* is in an unsatisfactory state and probably will remain so until aided by the results of investigation by inoculation methods. A collection on *Solidago serotina* (Adams, June 21, 1917) that I have referred to *Septoria davisii* Sacc. bears sporules 42–75 x 1 $\frac{1}{2}$ –2 μ .

The sporules of *Septoria bacilligera* Wint. as it occurs in Wisconsin are not typical. I find them to vary from 10–50 x 1–2 μ .

Haymaker who has made studies of *Monilia* at the University of Wisconsin considers the forms on *Prunus serotina* and *P. vir-*

giniana in the vicinity of Madison identical, conforming to the description of *Monilia angustior* (Sacc.) Reade.

The *Monilia* on plum fruit given as *M. fructigena* Pers. in the provisional list is now referred to *M. cinerea* Bon. It is sometimes abundant on "plum pockets" on *Prunus americana* and *P. nigra*.

The Mucedine on *Ranunculus abortivus* recorded as *Septocylindrium ranunculi* Pk. in the provisional list I am now referring to *Ramularia aequivoca* (Ces.) Sacc. together with specimens on *Ranunculus septentrionalis* from Madison and St. Croix Falls. On the latter host the conidiophores are in larger fascicles from a stromatic base as in the type of *Septocylindrium ranunculi* Pk. and *Ramularia acris* Lindr. Both of these are on *Ranunculus acris* and they seem to be identical. Ferraris (*Fl. Ital. Crypt.: Hyphales*: 800) distinguishes *R. acris* Lindr. from *R. aequivoca* (Ces.) Sacc. by the longer (30–60 μ) conidiophores but the distinction does not hold in *Mycotheca Germanica*, 1286. I have seen no specimen of *Ramularia scelerata* Cke.

In the description of *Cercospora filiformis* Davis (*Trans. Wis. Acad.* **18¹**: 266) the maximum length of the conidia should be increased to 100 μ as shown by specimens collected at Hixton in July 1916.

Instead of *Cercospora leptosperma* Pk. or *Cylindrosporium leptospermum* Pk. I am now using *Cercospora leptosperma* (Pk.).

Fusarium heterosporum Nees is referred to *F. graminum* Cda. by Ferraris (*Fl. Ital. Crypt.: Hyphales*: 90).

Puccinia claytoniata (Schw.) Syd. (*P. mariae-wilsoni* Clint.) seems also to have been omitted from the provisional list. Aecia and telia occur in Wisconsin on *Claytonia virginica* as was stated in the supplementary list.

ADDITIONAL HOSTS.

Albugo candida (Pers.) O. Kuntze. On *Arabis canadensis*. Friendship.

Plasmopara halstedii (Farl.) Berl. & DeToni. On *Ambrosia psilostachya*. Adams.

Peronospora trifoliorum D By. On *Lupinus perennis*. Millston.

Lophodermium pinastri (Schrad.) Chev. On *Pinus resinosa*. Black River Falls.

Pseudopeziza autumnalis (Fckl.) Sacc. On *Galium Claytoni*. Shiocton. This fungus was erroneously listed as *Ps. repanda* in the provisional list.

Exoascus communis Sadeb. On fruit of *Prunus pumila*. Two Rivers.

Phyllosticta cruenta (Fr.) Kickx. On *Polygonatum commutatum*. Darwin. In this collection the sporules are 13–21 x 4–6 μ . The spots appear to have been caused by leaf miners and have a very narrow border.

Phyllosticta decidua Ell. & Kell. On *Galeopsis Tetrahit* accompanying *Septoria galeopsidis*. Kewaunee. That this is distinct from species that have been described as occurring on *Labiatæ* in Europe seems open to question. In this collection the sporules are 6–9 x 2 $\frac{1}{2}$ –3 μ often contain 2 or 3 guttulae and not infrequently there is a median division of the cytoplasm. On *Humulus Lupulus*. Black River Falls.

Ascochyta thapsii E. & B. var. *lycopina*.*

Spots suborbicular to angular, blackish brown above, lighter below, becoming paler in the center, immarginate, 3–10 mm. in diameter; pyenidia few, scattered, usually innate, ostiole directed toward the upper surface of the leaf, very inconspicuous; sporules hyaline or smoky tinged, cylindrical with rounded ends, uniseptate, not constricted, 16–24 x 7–9 μ . On leaves of *Lycopus uniflorus*. Two Rivers, July, Shiocton, August, 1917.

Darluca flum (Biv.) Cast. In telia of *Kuehneola uredinis* on *Rubus hispida*, Millston and those of *Puccinia curtipes* Howe on *Heuchera hispida*. Hixton. These are the only exceptions

* Duplication of v. 700.

that I have seen to the rule that this parasite is confined to ure-dinia.

Stagonospora smilacis (Ell. & Mart.) Sacc. On *Smilax ecirhata*. Shiocton. Immature. Sporules continuous, 10–12 x 5–6 μ .

Specimens on leaves of *Triticum vulgare* (cult.) collected at Madison seem to me to be referable to *Septoria agropyri* Ell. & Evht. The pycnidia are globose to oval, 75–100 x 60–90 μ ; sporules 15–40 x 1–1 $\frac{1}{2}$ μ .

A *Septoria* on leaves of *Secale cereale* (cult.) collected at Lyndon Station I have referred to *S. passerinii* Sacc. The pycnidia are scattered over more or less elongated, light yellow areas, are black and about 100 μ in diameter; sporules straight or curved, acute, continuous, 30–42 x 1 $\frac{1}{2}$ μ . The distinctness of this and the preceding seems to be questionable.

Septoria caricinella Sacc. & Roum. On *Carex cephalophora*. Seymour:

Phleospora aceris (Lib.) Sacc. On *Acer saccharinum*. Grant county and Shiocton.

Leptothyrium dryinum Sacc. On *Quercus ellipsoidalis*. Lyndon Station. Sporules about 17 x 9 μ .

Gloeosporium confluens Ell. & Dearn. On *Sagittaria arifolia*. Shiocton.

Colletotrichum graminicolum (Ces.) Wilson. On *Calamagrostis canadensis*. Spooner. *Bromus altissimus*. Plover.

Septogloeum salicinum (Pk.) Sacc. On *Salix rostrata*. Danbury. *Salix discolor*. Shiocton. What I take to be a micro-conidial state, bearing sporules 4–8 x 1 μ , has been collected at Danbury.

Monilia has been collected at Madison on *Amelanchier oblongifolia* with conidia 8–15 x 6–12 μ . Its relationships are not clear.

Ramularia alismatis Fautr. On *Sagittaria heterophylla*. Arcadia. While this mucilage is not uncommon on *Alisma* and *Alisma* and *Sagittaria* frequently grow together I have seen the parasite on *Sagittaria* but once and then not in abundance.

Cercospora dubia (Riess) Wint. On *Chenopodium capitatum*. Shiocton. I do not find that the distinctions drawn by Bubak between this species and *C. chenopodii* Fresen. (*Ann. Mycol.*

6:28) hold in Wisconsin. The collection on this host is more of the *C. chenopodii* type.

Cercospora absinthii (Pk.) Sacc. On *Artemisia Absinthium*. Caseo.

Doassansia sagittariae (West.) Fisch. On *Sagittaria arifolia* Shiocton and Racine.

Gymnoconia peckiana (Howe) Trotter. Caeoma on *Rubus hispida*. Necedah.

Cronartium quercus (Brondeau) Schroet. Uredinia on *Quercus bicolor* and *Q. ellipsoidalis*. Necedah. Telia on *Q. macrocarpa*, *Q. rubra* and *Q. ellipsoidalis*. The latter is the most common host of the telia in Wisconsin.

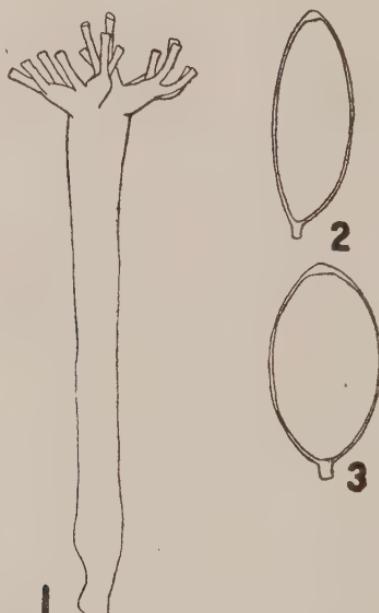
Peridermium comptoniae (Arth.) Orton & Adams. On *Pinus austriaca* in the state nursery on Trout lake in Vilas county.

ADDITIONAL SPECIES.

Physoderma vagans Schroet. To this species I am provisionally referring specimens on leaflets of *Sium cicutaefolium* collected in August, 1917 at Shiocton. The galls are round to elliptical, prominent, 1-2 mm. long; the resting spores 1-8 in each cell, globose to elliptical, 18-21 x 14-18 μ with walls about 3 μ thick. The host cells become inflated and rounded (up to 70 x 50 μ) the walls thin, fuscous and having a chitinoid appearance.

PLASMOPARA CEPHALOPHORA n. sp. Conidiophores hypophylloous, effused, stout, straight, often clavate, 150-270 x 6-14 μ , simple to the apex which is divided into a few short (6-15 μ) stout branches which are irregularly divided into the ultimate branchlets which are terete, straight, truncate sometimes swollen at the apex; conidia hyaline, elliptical to oblong-fusoid, more or less acute at each end, flattened on one side, stipitate, furnished with an apical papilla, 45-70 x 20-33 μ . On leaves of *Physostegia parviflora*. Shiocton, Plover and Dexterville, August, 1917. The conidia are imbricated in a compact head, bending of the pedicel (about 3 μ long) allowing adjustment of position under pressure. The flattening of the conidia is perhaps the result of crowding; at least it facilitates close packing.

This mildew is near *Basidiophora* which it resembles in the position of the conidia and the character of the basidia but differs in the apical portion of the conidiophore not being abruptly swollen and rounded, but branched or cleft. In the Dexterville collection immature oöspores of the ordinary *Plasmopara* type were found.



Plasmopara cephalophora n. sp. 1. Conidiophore. 2 and 3 side and face views of conidium. Magnified 775 diameters and reduced one-half. Drawn by Mabel M. Brown with aid of camera lucida.

Peronospora silenes Wilson. On stems, leaves and fructification of *Silene antirrhina*. Necedah. Oospores especially abundant in the capsules.

Peronospora linariae Fckl. On leaves and stems of *Linaria canadensis*. Lyndon Station. With oöspores.

Of a collection on living leaves of *Urtica* the following notes were made: Spots immarginate, round to oval, blackish brown becoming cinereous above, olivaceous becoming brownish below, 1-2½ cm. long, often confluent; perithecia hypophyllous, scattered, prominent, about 120 μ in diameter; asci clavate-cylindrical, incurved, octosporous, 40-60 x 7-9 μ ; ascospores hyaline, fusoid, obtuse, becoming triseptate, 16-21 x 4-5 μ ; paraphyses filiform, very slender. On living leaves of *Urtica gracilis*.

Whitehall, Wisconsin, July 27, 1916. I have referred this, with some doubt, to *Metasphaeria chaetostoma* Sacc. var. *urticæ* Rehm.

Keithia tsugae Farl. occurs on *Tsuga canadensis* in Wisconsin but has not been included in these lists because of doubt as to its parasitism. It has been found only on dead leaves attached to dead twigs. More favorable opportunities for observation however lead me to surmise that the death of the twigs is caused by the organism that sporulates on the leaves. The appearance of an infected tree reminds one of fire blight. It was especially abundant at Two Rivers in 1917.

Lophodermium juniperinum (Fr.) De Not. On *Juniperus communis depressa*. Two Rivers.

PHYLLOSTICTA BOEHMERIICOLA n. sp. Spots suborbicular, olivaceous with a darker margin and pale, sordid, central portion, 3-10 mm. in diameter; pycnidia epiphyllous, scattered, lenticular, succineous, ostiolate, 100-150 μ ; sporules oval to oblong, fuligenous tinted, 4-7 x 2-3 μ . On leaves of *Boehmeria cylindrica*. Shiocton. August 1917.

Phyllosticta minutissima Ell. & Evht. On *Acer saccharinum*; accompanied by *Phloeospora aceris*. Shiocton.

Phyllosticta ulmicola Sacc. Under this name I am recording the occurrence of a fungus having the following characters: Spots definite, immarginate, orbicular, light brown becoming cinereous above and lacerate, finally falling away in fragments, 3-7 mm. in diameter, sometimes confluent; pycnidia epiphyllous, scattered, black, globose to depressed-globose, 60-80 μ ; sporules globose to elliptical, olivaceous-hyaline, continuous, 3-6 x 2-3 μ . On *Ulmus americana*. Tisch Mills August 3, 1917. *Ulmus racemosa* August 5, 1917. This is probably a member of a group to forms of which various names have been applied in Europe and America.

Phyllosticta mitellae Pk. On *Mitella diphylla*. Melvina. In the collection that I am provisionally referring to this species the pycnidia are light brown and the sporules oblong to elliptical, 4-6 x 2-3 μ . Occasional sporules have a median septum.

ASCOCHYTA NEPETAE n. sp. ad interim. Spots orbicular to elliptical, olivaceous usually with a narrow darker margin, 4-10

mm. long; pycnidia epiphyllous, few, scattered, depressed-globose, succineous with a dark ostiolar ring; sporules hyaline, oblong, uniseptate, not constricted, $10-14 \times 3\mu$. On leaves of *Nepeta cataria*. Shiocton, August 1917.

Septoria sedi West. On *Sedum purpureum*. Plover. This is the fungus issued under this name in *Fungi Columbiani* 3081 and described by Peck as *Septoria sedicola* n. sp. (Report 1909 p. 29). I have not seen European material.

Septoria chamaecisti Vestergr. On leaves of *Lechea intermedia*. Plover.

Septoria acerina Pk. On *Acer spicatum*. Casco. This appears to be a member of the *Phloeospora aceris* group referred to in "Notes" I, pp. 80-81 and the spore body as I have seen it is an acervulus. Inoculation work seems to be required to define the relationship of the members of this group.

Septoria purpurascens Ell. & Mart. On *Potentilla arguta*. Lyndon Station. This is the form with epiphyllous pycnidia distributed in *Fungi Columbiani* 3487 and *F. Exot. Exsicc.* 143. I have not seen *S. potentillina* Thuem. the description of which suggests similarity.

Septoria delphinella Sacc. Spots orbicular to linear, brown to umber, 3-12 mm. long; pycnidia amphigenous but more numerous above, globose, with dark brown wall about 3μ thick, $60-90\mu$ in diameter; sporules acicular, straight or curved, $35-50 \times 1\mu$. On leaves of *Delphinium Penardi*. Hixton, July, 1916. This often causes the death of the portion of the narrow leaf lobe which is distal to the spot. The fungus is allied to *Septoria hepaticae* Desm. and *S. aquilegiae* Ell. & Kell.

Septoria araliae Ell. & Evht. On *Panax trifolia*. Millston.

Septoria menthicola Sacc. & Let. On *Mentha arvensis*. Madison. Pycnidia globose, about 60μ in diameter; sporules curved, $18-33 \times 1-1\frac{1}{2}\mu$.

Septoria lupincola Dearn. On *Lupinus perennis*. Black River Falls.

Typical specimens of *Septoria paupera* Ellis have been collected in Wisconsin but I have not been able to divide the specimens on *Helianthus* satisfactorily.

Specimens on *Lactuca Scariola integrata* collected at Madison September 30, 1916 bear orbicular, cinereous spots with a pronounced dark border; the pycnidia are innate and the sporules $24-30 \times 1-1\frac{1}{2}\mu$. This seems to be *Septoria unicolor* Wint. A collection on *Lactuca Scariola* made at the same station October 6, 1916 has the spots somewhat angular, definite but not margined, sometimes confluent and sporules about $30 \times 1\mu$.

Colletotrichum salmonicolor O'Gara (*Mycologia*, 7: 40) Of a collection that seems referable to this species the following notes were made.

Spots numerous, scattered, subcircular, black, about 1 mm. in diameter, sometimes confluent; acervuli hypophyllous and caulicolous, flat, $60-120\mu$ wide, usually solitary in the center of the spot, soon exposed, the spore masses bright salmon color; sporules hyaline, as seen singly, with thin walls and granular contents, cylindrical, usually straight, $18-27 \times 3\frac{1}{2}-6\mu$ borne on similar but smaller ($10-15 \times 3\mu$) basidia. On leaves of *Asclepias syriaca*. Arcadia, Wisconsin, September, 1917. On the midribs and stems the spots are longer and acute at each end. Black setae occur in the acervuli occasionally. This differs from *Hainesia* only in the thick sporophore and occasional setae. It was abundant at the station where observed. It may be that this is not distinct from the fungus described by Saccardo as *Gloeosporium mollierianum* Thuem. var. *folliculosum* which occurred on follicles of *Asclepias verticillata* in a botanical garden in Portugal. (*Fl. Myc. Lusit.* 11: 13 [1903], *Syll. Fung.* 18: 458) of which I have not seen specimens.

In July 1916 *Gaylussacia baccata* bushes were noticed at Hixton that had the appearance of having been attacked by *Monilia* and on examination a few broad-limoniform conidia were found which measured $24-27 \times 18-20\mu$. The material hardly warrants a determination but has been filed under the label *Monilia peckiana* Sacc. & Vogl.

Rhynchosporium secalis (Oud.) n. comb. (*Marsonia secalis* Oud. *Rhynchosporium graminicola* Heinsen). On *Hordeum vulgare* (cult.) Madison.

SEPTOCYLINDRIUM ACUTUM n. sp. Spots definite, elliptical, brown becoming grey, often confluent, 1-8 mm. long; conidia amphigenous but more abundant above, hyaline, lance-fusoid,

catenulate, becoming uniseptate, straight or somewhat curved, $15-39 \times 3\mu$. On leaves of *Agrostis alba*. Black River Falls, June 30, 1916. The septa are thin and not conspicuous.

Ovularia pulchella (Ces.) Sacc. var. **AGROPYRI** n. var.

Spots linear to oblong, dark brown becoming paler in the center, usually surrounded by a yellowish discoloration of the leaf, 2-5 mm. long, sometimes confluent; conidiophores amphigenous in small tufts or scattered, hyaline, straight or geniculate, $40-65 \times 2-3\mu$; conidia acro-pleurogenous, spherical to oval, hyaline, $9-12 \times 6-9\mu$. On leaves of *Agropyron tenerum*. Hixton, July 7, 1916.

In the supplementary list, p. 173, a *Ramularia* on *Fagopyrum* was noted under *Ramularia rufomaculans* Pk. but it was not included in the provisional list. It has been described as *Ramularia anomala* n. sp. by Peck in the Report of the State Botanist for 1912, p. 47.

RAMULARIA UMBRINA n. sp.

Spots orbicular to elliptical to angular, umber colored with a narrow, dark, raised margin and surrounded by more or less purple discoloration of the upper surface of the leaf, 2-5 mm. in diameter; conidiophores mostly hypopylous in small tufts, subulate to terete, hyaline, straight, simple, continuous, often denticulate near the apex, $9-17 \times 2-3\mu$; conidia hyaline, straight, catenulate, fusiform to cylindrical, sometimes uniseptate, $5-16 \times 1\frac{1}{2}-2\mu$. On leaves of *Diervilla Lonicera*. Millston, Wisconsin, June 27, 1916. Hixton, Wisconsin, July 5, 1916.

Cercospora violae Sacc. On *Viola sp. indet.* Monroe (Cope-land, 1901).

CERCOSPORA PANICI n. sp.

Spots fusoid, ferruginous, central portion sordid white, $2-4 \times 1-2$ mm. Conidiophores amphigenous, caespitose, fuliginous, straight or more or less flexuose and nodulose, $30-40 \times 3\mu$; conidia hyaline, cylindrical, straight or curved, catenulate (?), $30-40 \times 2-3\mu$. On leaves of *Panicum latifolium*. Shiocton, Wisconsin, August 15, 1917.

Fusarium sphaeriae Fckl. var. **ROBUSTUM** n. var. Conidia 7-11 septate, $60-75 \times 5-6\mu$. On perithecia of *Apiosporina collinsii*. Hixton, July 4, 1916.

CERCOSPORA CICHORII n. sp.

Spots suborbicular, light brown to alutaceous to cinereous, more or less marked by concentric lines, 2-6 mm. in diameter, sometimes confluent; conidiophores mostly epiphyllous in small spreading tufts, brown, straight, curved or somewhat flexuose, terete or torulose and denticulate, continuous or septate, 20-75 x 3-6 μ ; conidia hyaline, oblavate-cylindrical, straight, septate, 90-150 x 4-6 μ . On leaves of *Cichorium Intybus*. Madison, Wisconsin. September and October. If no Cercospora occurs on chicory in Europe one would suspect that this is an American species that has passed over from some related host but if so I do not know what it is.

ENTYLOMA PARVUM n. sp.

Sori on the upper portion of the culm, black, linear, about $\frac{1}{2}$ mm. long; spores aggregated, compacted, fuligenous, sub-globose or sometimes oval or ovate, smooth, 7-10 μ long. On *Eleocharis acicularis*. Plover, Wisconsin, August 1917, Madison, Wisconsin, August 1892, (Cheney) Cambridge, Mass. 1906. (Grossenbacher, com. Farlow). This is most nearly allied to *Entyloma lineatum* (Cke.) Davis.

All collections of *Caeoma nitens* were tested as to spore germination in 1917. Of them one, from blackberry in the horticultural garden, developed promycelia and sporidia. This was the earliest collection of the season. All the others formed germ tubes. Arthur proposed the genus *Kunkelia* for the short cycled form in which the spores germinate as teliospores. (*Bot. Gaz.* 63: 4 [1917].

University of Wisconsin Herbarium.

Madison, Wisconsin, April 1918.

INDEX TO HOSTS

IN "NOTES" IV, V, and VI.

Acalypha virginica: v, 695
Acer negundo: v, 691
Acer rubrum: v, 702
Acer saccharinum: iv, 678; v, 702; vi, 708, 711
Acer spicatum: iv, 679; vi, 712
Acorus calamus: iv, 687
Actaea rubra: v, 698
Adiantum pedatum: iv, 689
Agastache foeniculum: v, 700
Agastache scrophulariaefolia: v, 699
Agrimonia gryposepala: v, 693
Agrimonia mollis: iv, 677
Agrimonia striata: iv, 678; v, 693
Agropyron repens: iv, 676; v, 697
Agropyron tenerum: iv, 676; vi, 714
Agrostis alba: vi, 714
Allium cepa: v, 701
Alnus incana: v, 691
Ambrosia psilostachya: vi, 707
Ambrosia trifida: v, 694
Amelanchier oblongifolia: vi, 708
Anemone canadensis: v, 692
Anemone quinquefolia: iv, 676; 685; v, 692
Apiosporina collinsii: vi, 714
Apocynum androsaemifolium: v, 699
Arabis canadensis: vi, 707
Aralia nudicaulis: iv, 689
Arenaria lateriflora: iv, 689
Artemisia absinthium: vi, 709
Artemisia ludoviciana: v, 693
Asclepias syriaca: v, 692, 701; vi, 713
Asclepias verticillata: vi, 713
Aster: v, 692; vi, 705
Aster azureus: v, 694
Aster drummondii: v, 700
Aster macrophyllus: iv, 680
Aster puniceus: iv, 675
Astragalus canadensis: iv, 686

Baptisia leucantha: v, 702
Betula alba: v, 698
Bidens cernua: iv, 677
Bidens vulgata: iv, 679

Boehmeria cylindrica: iv, 681, 682; vi, 711
Bromus altissimus: v, 694; vi, 708
Bromus secalinus: v, 695

Calamagrostis canadensis: v, 697, 698; vi, 708
Capsicum: iv, 686
Carex cephalophora: vi, 708
Carex gracillima: iv, 689
Carex grisea: iv, 687
Carex paupercula irrigua: iv, 689
Carex pensylvanica: iv, 685
Carex siccata: v, 695
Carex trichocarpa: iv, 680
Carya alba: v, 694
Carya cordiformis: v, 694
Carya ovata: iv, 672
Chenopodium capitatum: iv, 683; vi, 708
Chrysanthemum: iv, 685
Cichorium intybus: vi, 715
Cicuta maculata: v, 700
Cinna arundinacea: v, 695
Cirsium altissimum: v, 699
Claytonia virginica: vi, 706
Clematis: v, 698
Clintonia borealis: iv, 677
Cornus paniculata: v, 701
Corylus americana: iv, 679; v, 697
Corylus rostrata: v, 694
Crataegus: v, 692
Cucumis sativus: v, 694, 699
Cucurbita melo: v, 694

Datura metel: iv, 689
Datura stramonium: iv, 689
Delphinium penardi: vi, 712
Dentaria diphylla: iv, 677
Desmodium paniculatum: v, 694
Diervilla lonicera: iv, 689; vi, 714

Echinocystis lobata: v, 697
Eleocharis acicularis: vi, 715
Elymus: iv, 677; v, 696
Elymus virginicus: v, 701
Epilobium adenocaulon: iv, 678

Erigeron: vi, 705
Erigeron canadense: iv, 677, 679
Eriophorum virginicum: v, 703
Eupatorium purpureum: v, 702
Eupatorium urticaefolium: iv, 675
 v, 700
Euphorbia dentata: v, 694

Fagopyrum: vi, 714
Fragaria virginiana: v, 691

Galeopsis tetrahit: vi, 707
Gaulium claytoni: vi, 707
Gaylussacia baccata: vi, 713
Glyceria nervata: iv, 678

Halenia deflexa: iv, 677, 688
Helianthemum canadense: iv, 687
Helianthus: iv, 689; vi, 712
Helianthus strumosus: v, 700
Hepatica acutiloba: v, 692
Hepatica triloba: v, 692
Heuchera hispida: vi, 707
Hordeum vulgare: iv, 678; vi, 713
Houstonia longifolia: v, 703
Humulus lupulus: iv, 671; vi, 707
Hystrix patula: v, 696

Iris: iv, 687
Iva xanthifolia: iv, 683

Juglans cinerea: iv, 677
Juniperus communis depressa: vi, 711

Koeleria cristata: v, 695
Krigia amplexicaulis: v, 693, 695
 701
Kuehneola uredinis: vi, 707

Lactuca scariola: vi, 713
Lactuca scariola integrata: vi, 713
Lactuca spicata: iv, 680
Lechea intermedia: vi, 712
Lepidium apetalum: v, 694
Liatris cylindracea: v, 695
Liatris scariosa: v, 695
Linaria canadensis: vi, 710
Linnaea borealis: iv, 681
Lonicera hirsuta: iv, 677
Lupinus perennis: iv, 677; v, 702;
 vi, 707, 712
Luzula saltuensis: iv, 680
Lycopus uniflorus: v, 700; vi, 707

Medicago sativa: iv, 683; v, 698, 703
Melampsora: iv, 679
Melica striata: iv, 676
Mentha arvensis: vi, 712
Mentha canadensis: iv, 688

Mitella: v, 701
Mitella diphylla: iv, 689; vi, 711
Monarda fistulosa: iv, 688
Muhlenbergia: v, 697

Napaea dioica: iv, 678
Nepeta cataria: vi, 712

Oakesia sessilifolia: v, 703
Oryzopsis asperifolia: v, 697
Ostrya virginiana: iv, 677

Panax trifolia: vi, 712
Panicum huachucae: v, 697
Panicum latifolium: v, 697, vi, 714
Panicum virgatum: iv, 685
Physalis pubescens: v, 694
Physostegia parviflora: vi, 709, 710
Pinus austriaca: vi, 709
Pinus banksiana: v, 693, 695, 696
Pinus resinosa: vi, 707
Pinus strobus: v, 696, 703
Platanus occidentalis: iv, 679
Poa triflora: iv, 678
Polygonatum biflorum: iv, 678
Polygonatum commutatum: vi, 707
Polygonum erectum: v, 702
Polygonum pennsylvanicum: v, 694
Polygonatum biflorum: iv, 678
Polytaenia nuttallii: v, 702
Populus balsamifera: iv, 679
Populus deltoides: iv, 679
Populus grandidentata: iv, 676
Populus tremuloides: iv, 676, 686
Potentilla arguta: vi, 712
Potentilla canadensis: iv, 678
Prunus americana: iv, 683; vi, 706
Prunus cuneata: iv, 680
Prunus domestica: iv, 678
Prunus pennsylvanica: v, 694
Prunus nigra: vi, 706
Prunus pumila: vi, 707
Prunus serotina: v, 694; vi, 705
Prunus virginiana: vi, 705
Pteris aquilina: iv, 689; v, 701
Puccinia curtipes: vi, 707

Quercus bicolor: vi, 709
Quercus ellipsoidalis: iv, 678; vi,
 708, 709
Quercus macrocarpa: v, 693; vi, 709
Quercus rubra: vi, 709
Quercus velutina: iv, 672

Radicula nasturtium-aquaticum: iv,
 687
Ranunculus abortivus: vi, 706
Ranunculus septentrionalis: vi, 706
Ribes americanum: iv, 683

Ribes cynosbati: v, 703
Rubus hispida: iv, 677; v, 693, 696; vi, 707, 709
Rubus triflorus: iv, 677
Rudbeckia hirta: iv, 680
Rumex britannica: vi, 705
Rumex mexicanus: iv, 673
Rumex verticillatus: vi, 705

Sagittaria arifolia: v, 704; vi, 708, 709
Sagittaria heterophylla: v, 704, vi, 708
Sagittaria latifolia: v, 704
Sagittaria sagittifolia: v, 704
Salix: v, 701
Salix cordata: iv, 680; v, 690
Salix discolor: iv, 680, 686; vi, 708
Salix fendleriana: v, 690
Salix longifolia: iv, 686
Salix lucida: iv, 687; v, 690
Salix pedicellaris: iv, 680
Salix rostrata: vi, 708
Sambucus canadensis: iv, 688
Sambucus racemosa: v, 693
Sanicula gregaria: iv, 687
Sanicula marilandica: v, 700
Saponaria officinalis: iv, 689
Secale cereale: vi, 708
Sedum purpureum: vi, 712
Senecio aureus: v, 703
Silene antirrhina: vi, 710
Silphium: iv, 689; v, 700
Silphium perfoliatum: iv, 686
Silphium terebinthinaceum: iv, 689
Sisyrinchium: v, 703
Sium cicutaefolium: vi, 709
Smilax: iv, 672

Smilax ecirhata: vi, 708
Smilax rotundifolia: iv, 673
Solidago: iv, 675; vi, 705
Solidago altissima: iv, 680, 681
Solidago canadensis: iv, 689
Solidago serotina: vi, 705
Sonchus asper: v, 703
Spartina: v, 692
Sphenopholis obtusata: iv, 680
Spirogyra: iv, 681
Stachys tenuifolia: v, 701
Steironema ciliatum: iv, 689
Steironema lanceolatum: v, 694
Strelitzia angusta: iv, 672
Symphoricarpos orbiculatus: iv, 678

Thalictrum: v, 698
Tiarella: v, 701
Tilia americana: iv, 683
Trifolium hybridum: iv, 684; v, 692
Trifolium pratense: v, 692
Trifolium repens: iv, 674, 684
Triticum vulgare: iv, 685; vi, 708
Tsuga canadensis: vi, 711
Typha latifolia: iv, 684

Ulmus americana: vi, 711
Ulmus fulva: iv, 685
Ulmus racemosa: v, 693; vi, 711
Urtica gracilis: vi, 710
Uvularia grandiflora: v, 693

Vaccinium oxycoccus: iv, 679
Vernonia: v, 700
Viola: vi, 714
Viola canadensis: iv, 674
Viola conspersa: iv, 677

Zizia aurea: v, 700

INDEX TO FUNGI

Referred to in "Notes" I-VI

Actinonema actaeae: (Allesch.) Ascochyta graminicola Sacc.: v, 698
 Died.: v, 698
 Ascochyta imperfecta Pk.: v, 698
 Actinonema rosae (Lib.) Fr.: i, 80 Ascochyta lethalis Ell., & Barth.: ii, 102; iv, 673
 Aecidium compositarum: ii, 96
 Aecidium falcatae Arth: ii, 96 Ascochyta lophanthi Davis: v, 699
 Aecidium houstoniatum Schw.: v, Ascochyta lophanthi osmophila n. 703 var.: v, 700
 Aecidium latridis Ell. & And.: iii, Ascochyta marginata n. sp.: iii, 263 269
 Ascochyta meliloti (Trel.): iv, 673
 Aecidium lupini Pk.: iii, 269 Ascochyta nepetae n. sp.: vi, 711
 Aecidium maianthae Schum.: iii, Ascochyta pisi Lib.: i, 80 262; v, 703 Ascochyta salicifoliae (Trel.): iv, 673
 Ascochyta saniculae n. sp.: ii, 105; v, 700
 Aecidium nesaeae Ger.: iv, 676
 Aecidium proserpinaceae B. & C.: ii, 107 Ascochyta thaspiae E. & E.: v, 700
 Aecidium ranunculacearum D C: iii, Ascochyta ~~thaspiae~~ lycopina n. var.: 262; iv, 676 v, 700; vi, 707
 Aecidium uvulariae Schw.: v, 703 Ascochyta treleasei Sacc & Vogl.: v, 700
 Aecidium xanthoxyli Pk.: ii, 107
 Albugo candida (Pers.) Kuntze: iv, Ascochyta trifolii Boud. & Triouss.: 677; vi, 707 iv, 684
 Alternaria crassa (Sacc.) Rands: iv, Ascochyta trifolii Siemaschko: iv, 689 684
 Alternaria sonchi Davis: v, 703 Ascochyta wisconsina n. sp.: ii, 101;
 Aphanomyces phycophila DBy.: iv, v, 693
 Apiosporina collinsii (Schw.) Asterina cupressina Cke.: ii, 101
 Hoehn.: iv, 671 Asterina plantaginis Ellis: i, 78
 Ascochyta aceris Lib.: i, 80, 81 Asterina rubicola E. & E.: i, 78; iii, 258
 Ascochyta actaeae (Bres.) n. comb.: v, 698 Asteroma ribicolum E. & E.: iv, 683
 Ascochyta alismatis E. & E.: i, 84 Asteroma umbonatum Desm.: iv, 683
 Ascochyta alismatis (Oud.) Trail: i, 84 Asteroma tiliae Rud.: iv, 683
 Ascochyta asclepiadis E. & E.: v, 701
 Ascochyta caulincola Laubert: ii, 102; Basidiophora entospora Roze & iv, 673 Cornu: iv, 677
 Ascochyta chenopodii (Karst.) Bremia lactucae Regel: v, 693
 Rostr.: iv, 683
 Ascochyta clematidina Thuem.: v, 698
 Ascochyta clematidina thalictri Davis: v, 698 Caeoma abietis-canadensis Farl.: ii, 96; iv, 676
 Ascochyta compositarum n. sp.: v, 700 Caeoma nitens Schw.: iii, 257; vi, 715
 Ascochyta compositarum parva n. var.: v, 700 Calyptospora goeppertiana Kuehn: ii, 96
 Ascochyta confusa E. & E.: iv, 673 Cercospora absinthii (Pk.) Sacc.: iii, 269; vi, 709
 Ascochyta confusa Bubak: iv, 685 Cercospora ageratoides E. & E.: iii, 269; iv 675
 Ascochyta cucumis Fautr. & Roum.: v, 699 Cercospora althaeina Sacc.: iii, 260

Cercospora aquilegiae Kell. & Sw.: i, 92
Cercospora arctostaphyli n. sp.: iii, 268
Cercospora camptosori n. sp.: iii, 267
Cercospora caricina Ell. & Dearn.: i, 86; ii, 100
Cercospora ceanothi Kell. & Sw.: i, 86
Cercospora chenopodii Fres.: vi, 708
Cercospora cichorii n. sp.: vi, 715
Cercospora circumscissa Sacc.: iii, 259; v, 694
Cercospora comandrae E. & Dearn.: iii, 267
Cercospora condensata E. & K.: iii, 267
Cercospora corni n. sp.: iii, 268; iv, 675
Cercospora crassa Sacc.: iv, 689
Cercospora daturae Pk.: iv, 689
Cercospora depazeoides Sacc.: iv, 688
Cercospora dubia (Riess) Wint.: vi, 708
Cercospora echinochloae n. sp.: ii, 106;
Cercospora echinocystis E. & M.: iii, 268
Cercospora effusa (B. & C.) E. & E.: iii, 268
Cercospora erysimi n. sp.: iii, 267
Cercospora fingens n. sp.: i, 92
Cercospora fuliginosa E. & E.: i, 86
Cercospora gentianae Pk.: iv, 688
Cercospora gentianicola E. & E.: iv, 688
Cercospora geranii Kell. & Sw.: i, 83
Cercospora grindeliae Ell. & Evht.: iii, 269
Cercospora helvola *zebrina* (Pass.) Ferraris: iv, 675
Cercospora leptosperma Pk.: iii, 255; vi, 706
Cercospora longispora Pk.: v, 702
Cercospora macclatchieana Sacc. & Syd.: i, 86
Cercospora megalopotamica Speg.: iii, 256
Cercospora muhlenbergiae Atk.: iii, 267
Cercospora nasturtii Pass.: iv, 687
Cercospora negundinis E. & E.: iii, 267
Cercospora panici n. sp.: vi, 714
Cercospora passaloroides Wint.: ii, 106
Cercospora pentstemonis Ell. & Kell.: iii, 260
Cercospora polytaeniae Ell. & Kell.: v, 702
Cercospora rhoina Cke. & Ell.: ii, 100
Cercospora sanguinariae Pk.: iii, 267
Cercospora saniculae n. sp.: iv, 687
Cercospora sequoiae *juniperi* E. & E.: ii, 95
Cercospora subsanguinea E. & E.: i, 83
Cercospora varia Pk.: iii, 260
Cercospora velutina Ell. & Kell.: v, 702
Cercospora vexans C. Massal.: v, 691
Cercospora violae Sacc.: vi, 714
Cercospora zebrina Pass.: iv, 675
Cercosporella cana Sacc.: iv, 675
Cercosporella cana *gracilis* n. var.: iv, 675
Cercosporella dearnessii Bubak & Sacc.: iv, 675
Cercosporella exilis n. sp.: i, 91
Cercosporella filiformis n. sp.: iii, 266; vi, 706
Cercosporella leptosperma (Pk.): vi, 706
Cercosporella nivea Ell. & Barth.: ii, 105; iv, 675
Cercosporella ontariensis Sacc.: iv, 675
Cercosporella reticulata Pk.: iv, 675
Cercosporella scirpina n. sp.: iii, 266
Cercosporella trichophila n. sp. iii, 266
Cladosporium gloeosporioides Atk.: i, 91
Cladosporium humile n. sp.: v, 702
Cladosporium letiferum Pk.: iii, 256
Cladosporium paeoniae Pass.: i, 91
Cladosporium subsessile Ell. & Barth.: iv, 675
Coccochora rubi n. sp.: v, 696
Coccomyces hiemalis Higgins: iii, 255
Coccomyces lutescens Higgins, iii, 255
Coccomyces prunophorae Higgins: iii, 255
Coleosporium sonchi-arvensis (Pers.) Lev.: i, 92
Colletotrichum circinans (Berk.) Vogl.: v, 701
Colletotrichum graminicolum (Ces.) Wilson: iii, 265; vi, 708
Colletotrichum helianthi n. sp.: i, 89
Colletotrichum lagenarium (Pass.) E. & Hals.: v, 694
Colletotrichum nigrum Ell. & Hals.: iv, 686
Colletotrichum salmonicolor O'Gara: vi, 713
Colletotrichum silphii n. sp.: iv, 686

Colletotrichum solitarium Ell. & Barth.: i, 89
 Colletotrichum sordidum n. sp.: iii, 265
 Cronartium comandrae Arth.: iii, 261
 Cronartium comptoniae Arth.: vi, 709
 Cronartium quercus (Brondeau) Schroet.: vi, 709
 Cronartium ribicola Fisch de Waldh.: v, 703
 Cylindrosporium betulae Davis: ii, 99
 Cylindrosporium eminens n. sp.: iv, 687
 Cylindrosporium glyceriae E. & E.: ii, 99
 Cylindrosporium hiemale Higgins: iii, 255
 Cylindrosporium leptospermum Pk.: iii, 255; vi, 706
 Cylindrosporium lutescens Higgins: iii, 255
 Cylindrosporium oculatum E. & E.: i, 82
 Cylindrosporium padi Karst.: iii, 255
 Cylindrosporium prunophorae Higgins: iii, 255
 Cylindrosporium ribis Davis: iv, 673
 Cylindrosporium saccharinum E. & E.: i, 81; iv, 679
 Cylindrosporium salicifoliae (Trel.) Davis: iv, 673
 Cylindrosporium shepherdiae Sacc.: ii, 105
 Cylindrosporium vermiforme n. sp.: ii, 104; iv, 679; v, 694
 Cytodiplospora elymina n. sp.: v, 701

Darluca filum (Biv.) Cast.: iv, 679; vi, 707
 Depazea carpinea (Schw.) Fr.: i, 88
 Dibotryon morbosum (Schw.) Theiss. & Syd.: iv, 671
 Didymaria astragali (E. & H.) Sacc.: iii, 265
 Dimerosporium collinsii (Schw.) Thuem.: ii, 97; iv, 671
 Diplocarpon rosae Wolf: i, 80
 Diplodia uvulariae n. sp.: i, 87; v, 693
 Doassansia deformans Setch.: v, 704
 Doassansia furva n. sp.: v, 704
 Doassansia martianoffiana (Thuem.) Schroet.: v, 704
 Doassansia ranunculina Davis: iv, 681
 Doassansia sagittariae (West.) Fisch: v, 703; vi, 709
 Doassansia zizaniae Davis: v, 704
 Dothidella ulmea (Schw.) E. & E.: iii, 258; iv, 671

Endothella junci (Fr.) Theiss. & Syd.: iv, 672
 Endothella strelitiae (Cke.) Theiss. & Syd.: iv, 672
 Entomosporium maculatum cydoniae Sacc.: ii, 98
 Entyloma australe Speg.: v, 694
 Entyloma compositarum Farl.: iv, 680
 Entyloma floerkeae Holw.: i, 85
 Entyloma linariae veronicae Wint.: i, 85
 Entyloma lineatum (Cke.) Davis: ii, 96; vi, 715
 Entyloma nymphaeae (Cunn.) Setch.: ii, 97
 Entyloma parvum n. sp.: vi, 715
 Entyloma polysporum (Pk.) Farl.: iv, 680; v, 694
 Epichloe typhina (Pers.) Tul.: iv, 678
 Erysiphe cichoracearum DC.: iii, 252; iv, 678
 Erysiphe graminis D C.: iv, 678
 Erysiphe polygoni DC.: iii, 257
 Euryachora ulmi (Fr.) Schroet.: iii, 258; iv, 672
 Exoascus betulinus (Rostr.) Sadeb.: iii, 262
 Exoascus cerasi (Fckl.) Sacc.: iv, 672
 Exoascus coerulescens (M. & D.): Tul., ii, 98; iv, 678; v, 693
 Exoascus communis Sadeb.: iii, 262; iv, 678; vi, 707
 Exoascus confusus Atk.: ii, 97
 Exoascus insititiae Sadeb.: ii, 97
 Exoascus mirabilis Atk.: iv, 683
 Exoascus pruni Fckl.: iv, 678

Fusarium carpineum n. sp.: ii, 106
 Fusarium graminum Cda.: vi, 706
 Fusarium heterosporum Nees: vi, 706
 Fusarium sphaeriae robustum n. var.: vi, 714
 Fusarium uredinum E. & E.: i, 84
 Fusicladium radiosum (Lib.) Lind.: ii, 99; iii, 256
 Fusicladium radiosum microsporum (Sacc.) Allesch.: iii, 256; iv, 675
 Fusidium asteris Phil. & Pflowr.: v, 692

Gloeosporium apocryptum E. & E.: v, 691
 Gloeosporium boreale E. & E.: v, 690
 Gloeosporium canadense E. & E.: ii, 99
 Gloeosporium caryae Ell. & Dearn.: iii, 259; iv, 672; v, 694
 Gloeosporium cinctum B. & C.: i, 89

Gloeosporium cladosporioides E. & Hals.: i, 91
Gloeosporium confluens Ell. & Dearn.: vi, 708
Gloeosporium cylindrosporum (Bon.) Sacc.: ii, 103; v, 691
Gloeosporium davisii E. & E.: iv, 686
Gloeosporium fragariae (Lib.) Mont.: i, 83
Gloeosporium leptospermum Pk.: v, 701
Gloeosporium meliloti Trel.: iv, 673
Gloeosporium mollerianum folliculosum: vi, 713
Gloeosporium nervisequum (Fckl.) Sacc.: ii, 99; iv, 679
Gloeosporium pallidum Karst. & Har.: i, 89
Gloeosporium populinum Pk.: iv, 673
Gloeosporium ribis (Lib.) M. & D.: i, 84; ii, 99; iii, 259
Gloeosporium robergei Desm.: ii, 98
Gloeosporium saccharinum E. & E.: i, 86; ii, 94
Gloeosporium septorioides Sacc.: ii, 98; iii, 254, 259
Gloeosporium thalictri Davis: iii, 255
Gloeosporium tremuloides E. & E.: i, 84
Gloeosporium trifolii Pk.: ii, 265; iv, 674, 684
Glomerella cingulata (Stonem.) S. & V. S.: i, 89
Gnomonia caryaef Wolf: iv, 672
Gnomonia ulmea (Schw.) Thuem.: iv, 672
Gnomoniella fimbriata (Pers.) Schroet.: i, 79
Gnomoniella tubiformis (Tode) Sacc.: v, 691
Graphiothecium vinosum n. sp.: i, 90
Gymnoconia peckiana (Howe) Trotter: iii, 257; vi, 709
Gymnosporangium clavariaeforme (Jacq.) DC.: ii, 95
Gymnosporangium corniculans Kern: ii, 107
Gymnosporangium globosum Farl.: v, 692
Hendersonia typhae Oud.: iv, 684; v, 690
Heterosporium gracile (Wallr.) Sacc.: iv, 687
Hormodendron farinosum Bon.: 1, 90
Hyaloceras kriegerianum (Bres.) Died.: v, 691
Hyalopsora aspidiotus Pk.: ii, 107
Hypoderma desmazieri Duby: v, 696
Keithia tsugae Farl.: vi, 711
Kunkelia: vi, 715
Laestadia aesculi Pk.: iii, 252
Leptosphaeria caricicola Fautr.: i, 87
Leptosphaeria caricina Schroet.: i, 87
Leptosphaeria folliculata oxyspora n. var.: i, 87
Leptothyrium alneum (Lev.) Sacc.: v, 691
Leptothyrium betulae Fckl.: i, 89
Leptothyrium dryinum Sacc.: iii, 254; vi, 708
Lophodermium amplum n. sp.: iii, 252; v, 695-6
Lophodermium juniperinum (Fr.) De Not.: vi, 711
Lophodermium lineare Pk.: v, 696
Lophodermium pinastri (Schroet.) Chev.: v, 696; vi, 707
Macrophoma cruenta (Fr.) Ferraris: i, 80
Macrosporium saponariae Pk.: iv, 689
Marsonia secalis Oud.: vi, 713
Marssonina actaeae (Bres.) Magn.: v, 698
Marssonina baptisiae (E. & E.) Magn.: ii, 103
Marssonina brunnea (E. & E.) Magn.: i, 84
Marssonina castagnae (D. & M.) Magn.: i, 84; iv, 679, 686; vi, 705
Marssonina coronaria (E. & Davis) Davis: ii, 103
Marssonina martini (S. & E.) Magn.: ii, 99
Marssonina neilliae (Hark.) Magn.: ii, 108
Marssonina populi (Lib.) Magn.: vi, 705
Marssonina potentillae tormentillae Trail: iii, 259
Marssonina rhabdospora (E. & E.) Magn.: i, 82; ii, 103; iv, 674
Marssonina rosae (Lib.) Trail: i, 80
Marssonina rubiginosa E. & E.: v, 701
Melampsora abietis-canadensis (Farl.) Ludwig: iv, 676
Melampsora arctica Rostr.: ii, 107; iv, 680
Melampsora farlowii (Arth.) Davis: ii, 107
Melampsora populi-tsugae nom. nov.: iv, 676

Sphaelotheca sorghi (Lk.) Clinton: *Taphrina virginica* Seym. & Sadeb.: iv, 676
Sphaeria solidaginis Schw.: iv, 681
Sphaeropsis betulae foliicola n. var.: v, 697
Sphaerotheca humuli (D. C.) Burr.: iii, 257
Sphaerotheca humuli fuliginea (Schl.) Salm.: iv, 677
Sphaerotheca mors-uvae (Schw.) B. & C.: ii, 97
Sporonema phacidioides Desm.: iv, 674, 684
Stagonospora apocyni (Pk.) Davis: v, 699
Stagonospora atriplicis (West.) Lind: iv, 683, 684
Stagonospora caricinella Brun.: iii, 264
Stagonospora cirsii n. sp.: v, 699
Stagonospora compta (Sacc.) Died.: iv, 685
Stagonospora dearnessii Sacc.: iv, 674, 684
Stagonospora intermixta (Cke.) Sacc.: i, 87; ii, 98
Stagonospora paludosa (Sacc. & Speg.): Sacc.: ii, 102; iii, 264
Stagonospora smilacis (E. & M.): Sacc.: iv, 672; vi, 708
Stagonospora trifolii Ell. & Dearn.: iv, 684, 685
Stagonospora typhoidearum (Desm.) Sacc.: iv, 684
Stagonospora zonata n. sp.: v, 701
Stagonosporopsis actaeae (Allesch.) Died.: v, 698
Synchytrium aureum Schroet.: i, 85; iv, 677
Synchytrium cellulare n. sp.: iv, 681, 682
Synchytrium despiens Farl.: iii, 251
Taphrina coerulescens (Desm. & Mont.) Tul.: iv, 678; v, 693
Taphrina coryli Nishida: v, 697
Taphrina flava Farl.: iii, 262
Taphrina potentillae (Farl.) Johans.: iv, 678
Taphrina virginica Seym. & Sadeb.: ii, 98
Uncinula macrospora Pk.: v, 693
Uncinula parvula Cke. & Pk.: iii, 262
Uredinopsis atkinsonii Magn.: ii, 101; iii, 261
Uredo acedidioides, Pk.: iii, 251
Uredo oxytropidis (Pk.) De Toni: iii, 269
Urocystis anemones (Pers.) Schroet.: v, 692
Urocystis waldsteiniae Pk.: iv, 675
Uromyces acuminatus Arth.: iii, 260
Uromyces albus (Clint.) Diet. & Hol.: iii, 257
Uromyces astragali (Opiz) Sacc.: iii, 269
Uromyces euphorbiae C. & P.: ii, 100
Uromyces graminicola Burr.: ii, 106
Uromyces halstedii De Toni: ii, 100
Uromyces houstoniatus (Schw.) J. L. Sheldon: v, 703
Uromyces hyperici-frondosi (Schw.) Arth.: ii, 100; iii, 260
Uromyces junci-tenuis Syd.: ii, 100
Uromyces murrillii Ricker: v, 703
Uromyces poinsettiae Tranz.: iii, 260
Uromyces proeminens (D. C.) Lev.: ii, 100; iii, 260; v, 694
Uromyces pustulatus Schroet.: iii, 269
Uromyces scirpi Burr.: ii, 100
Uromyces striatus Schroet.: v, 703
Urophlyctis major Schroet.: vi, 705
Ustilago lorentziana Thuem.: 1, 85
Ustilago osmundae Pk.: i, 84
Ustilago utriculosa (Nees) Tul.: ii, 100
Venturia tremulae Aderh.: iii, 256
Vermicularia liliacearum West.: iii, 263
Woroninella aecidioides (Pk.) Syd.: iii, 251
Xyloma carpinea Schw.: i, 88

NOTES ON PARASITIC FUNGI IN WISCONSIN VII.-VIII

BY J. J. DAVIS

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XX

Issued February, 1922.



NOTES ON PARASITIC FUNGI IN WISCONSIN—VII.

J. J. DAVIS

The season of 1918 was not favorable for the parasitic fungus flora, apparently because of lack of precipitation. Even forms that occur on marsh or swamp plants seem to require rain for full development.

Plasmopara humuli Miyabe & Takahashi was found on *Humulus Lupulus* in 1918 at Bruce. This adds to the probability that it is indigenous in Wisconsin.

[Also found in small quantity at Little Suamico on the west shore of Green Bay in September 1921.]

Of a collection on *Smilax hispida* referred to *Stagonospora smilacis* (E. & M.) Sacc. it was noted that in some of the pycnidia the sporules were $15-20 \times 6-7\mu$, somewhat fusoid, hyaline, continuous, while in other pycnidia they were elliptical to ovate, subfuligineous, $10-13 \times 6-7\mu$ and many of them uniseptate.

In "Notes" IV (p. 68) reference was made to a *Septoria* on leaves of wheat which was referred to *S. glumarum* Pass. In a collection on *Triticum vulgare* (cult.) made at Bailey's Harbor, July 28, 1918, the pycnidia are located in the somewhat paler central portion of more or less elongate brown spots which are surrounded by a yellow discoloration of the leaf. The somewhat depressed, ostiolate pycnidia are $90-130\mu$ in diameter, the sporules $15-26 \times 3\mu$, appearing continuous but showing 1-3 divisions of the endoplasm when stained. *Septoria fusispora* Died. may be the same fungus (*Kryptogamenflora der Mark Brandenburg* 9: 467). The delicate spore tendrils have a pink tinge.

In the provisional list two species of *Septoria* were given as occurring on *Viola* in Wisconsin. In the *Enumeration and Description of North American Septorias* Dr. George Martin gave

the spore dimensions of *S. violae* West. as $40-50 \times 1\frac{1}{2}\mu$ (*Jour. Mycol.* 3: 73). The dimensions given by Diedicke in the *Kryptogamenflora der Mark Brandenburg* are $17-20 \times 1\mu$. In Wisconsin specimens the sporules are $20-36 \times 1\mu$. The small, circular arid spots are sometimes surrounded by pale brown discoloration, and the black perithecia are sometimes borne on such discolored peripheral areas. *Septoria hyalina* Ell. & Evht. was described as having sporules $20-40 \times 1\frac{1}{4}\mu$ and black pycnidia on spots having a dark purple border as contrasted with yellowish brown pycnidia on spots having a reddish brown border in *S. violae* West. At present I am referring all specimens on *Viola* to *S. violae* West., considering it to be a variable species.

Septoria intermedia Ell. & Evht., a species founded on a Wisconsin specimen, was included in the provisional list. In "Notes" III (pp. 253-254) it was stated that no similar material had been collected since, and the opinion was expressed that it is a short-spored form of *S. solidaginicola* Pk. In July, 1918, there was collected at Wild Rose on a large radical leaf of *Solidago* a specimen in which the sporules are $14-23\mu$ long by 1μ or less in thickness. The spots are more rounded and somewhat longer than in the type of *S. intermedia* Ell. & Evht., and the pycnidial walls are strongly thickened and blackened about the ostiole, the apex of the pycnidium being usually papilliform. I have labeled this *Septoria intermedia* Ell. & Evht., but think nevertheless that it is a form of *S. solidaginicola* Pk.

The conidiophores of *Cercospora callae* Pk. & Clint, are described as "short", but in some specimens they exceed 100μ in length.

It happened that shortly before looking at the description and figures of *Septoriopsis* Stevens & Dalbey (*Mycologia* 11: 4), I had been examining sections of *Ribes* leaves bearing *Septoria sibirica* Thuem. (Saccardo, *Ann. Mycol.* 13: 122). In this fungus, as it occurs in Wisconsin, the pycnidia are often defective thereby leading to the proposed name *Cylindrosporium ribis* Davis (*Trans. Wis. Acad.* 16: 759). In the sections at which I had been looking there had apparently been proliferation of the cells forming the pycnidial wall, filling the cavity and pushing the sporuligerous layer to the apex of the pycnidium, resulting in a stromatoid tubercle bearing sclecospores on its summit. The three figures illustrating *Septoriopsis* could be matched in a single section of the *Ribes* leaf.

This, of course, suggests that the proposed genus may have been founded upon abnormal material. However, there are fungi that seem to have normally the structure attributed to *Septoriopsis*, *i. e.*, a dark, cellular, tuberculiform pseudostroma emerging from the leaf and bearing sessile ascospores. An example of this is *Cercospora leptosperma* Pk. Another is *Cercospora longispora* Pk. I would not refer these to *Tubulariaceae* because the cellular pseudostroma is similar to that from which arise the conidiophores of many *Hyphales*, but rather to *Mucedinaceae* *micromeneae*. In this position the genus, if the type is normal, might be made to fill the gap to which I adverted in "Notes" III (p. 255). As to *Cercospora longispora* Pk: As I see it the dark "flocci" of the author's description are not conidiophores of the parasite but instead the conidia arise in tufts directly from small, dark, tuberculiform pseudostromata.

With this conception of the genus I am writing *SEPTORIOPSIS LONGISPORA* (Pk.) n. comb.

Cercospora longispora Pk. 35th Report p. 141.

SEPTORIOPSIS LEPTOSPERMA (Pk.) n. comb.

Cercospora leptosperma Pk. 30th Report p. 55.

Cylindrosporium leptospermum Pk. *Trans. Wis. Acad.* **14**: 91, 17: 883.

Cercosporella leptosperma (Pk.) *Davis Trans. Wis. Acad.* **19**: 706.

While these fall in *Hyphales* their phylogenetic relationship is probably with *Septoria* and the name is therefore an appropriate one.

Cylindrosporium tradescantiae Ell. & Kell. forms well developed pycnidia, and I am therefore referring it to *Septoria*.

Phleospora oxyacanthae (Kze. & Schm.) Wallr. was erroneously given as *Phl. crataegi* in the provisional list. There is a note on this fungus in "Notes" III (p. 254), where the proper name is used.

In "Notes" II (p. 99), *Populus balsamifera* was given as a host of *Fusicladium radiosum* (Lib.) Lind with the statement that but a single collection had been made. In July, 1918, another collection on this host was made in the same locality, Sturgeon Bay. Like the previous one this collection differs from the form on *Populus tremuloides* and *P. grandidentata* and should, I think, be kept distinct.

Fusicladium radiosum (Lib.) Lind var. *balsamiferae* n. var.

Conidia 20–33 x 10–11 μ , usually bisepitate, the short basal and apical cells similar and obtuse, central cell elliptic-oblong. On *Populus balsamifera*. Sturgeon Bay, Wisconsin. I have not seen the Venturia stage.

Aecidium iridis Gerard has been shown by Whetzel and Arthur to be connected with a rust on *Phalaris arundinacea* that is apparently a race of *Puccinia sessilis* Schneid. The propinquity of abundant aecia on Iris and uredinia on Phalaris was conspicuous along the shore of a small lake near Wild Rose in July, 1918.

In "Notes" IV (p. 676) there was a statement that the sorghum kernel smut upon which was based the record of *Sphacelotheca sorghi* (Lk.) Clinton in the preliminary list and thence to the provisional list, was *S. cruenta* (Kuehn) Potter as determined by Potter. This is not to be taken as indicating that *S. sorghi* (Lk.) Clint. does not also occur in the state.

Tracya lemnae (Setch.) Syd. was recorded in the third supplementary list on the basis of a collection on *Spirodela polyrhiza* in southeastern Wisconsin. I did not see it again until September, 1917, when it was collected at Arcadia in western Wisconsin. The spores are usually crowded and prismatic [This was collected also at Chetek in September, 1918.]

Telial specimens of Cronartium were collected on *Ribes cynosbati* in 1918 at Schofield (C. E. Allen) and Keshena (R. H. Deniston) in central Wisconsin. These locations are far removed from any known development of aecia.

The station near Sturgeon Bay where *Coleosporium sonchi-arvensis* (Pers.) Lev. was observed in 1912 and 1913 was visited in 1918, and uredinia were found to be present on leaves of *Sonchus asper*.

The Aecidium on *Euphorbia commutata* recorded under the name *Aecidium euphorbiae* Gmel. in the provisional list is *Aecidium tithymali* Arth. (*Bull. Torrey Bot. Club* 45: 151, [1918]). It has been observed in Wisconsin at but the single station, where it seemed to be nearly extinct when I last saw it.

Aecidium lysimachiae (Schlecht.) Wallr. has been connected with *Puccinia limosae* Magn. on Carex.

ADDITIONAL HOSTS

Synchytrium aureum Schroet.

On *Geum strictum*. Two Rivers. The material is not mature, but the parasite is doubtless the one that has been referred to this species

Peronospora parasitica (Pers.) Fr.

On *Lepidium apetalum*. Coloma and Hancock. On *Arabis hirsuta*. Fish Creek and Madison. Working mostly with European material, Gaeumann has divided the mildews on Cruciferae into upwards of fifty subspecies based primarily on physiological characters but using morphological characters also. (*Beih. Bot. Central.* 35: 395 *et seq.*). Field observation in Wisconsin indicates specialization on the various hosts.

Microsphaera alni (Wallr.) Wint.

To this species I have referred specimens on *Baptisia bracteata* collected at Arcadia. The measurements of the asci are 36–51 x 30–36 μ , of the spores 12–18 x 9 μ .

Erysiphe cichoracearum DC.

On *Artemisia serrata*. Arcadia.

Phyllachora on *Sporobolus cryptandrus* has been collected at Trempealeau by L. S. Cheney. The asci measured were 65–80 x 10–13 μ , the spores 10–12 x 6–7 μ .

Examination of a collection on *Thalictrum dioicum* made near Jacksonport, July 25, 1918, leads me to surmise that it is a microconidial state of *Ascochyta clematidina* Thuem. var. *thalictri* Davis with the pyenidia mostly imperfectly developed and that *Gloeosporium thalictri* Davis (*Trans. Wis. Acad.* 16: 760) is of the same character. A collection on *Thalictrum dasycarpum* made at Bruce August 30, 1918, is of the *Ascochyta clematidina* type having sporules 12–23 x 3–6 μ . The material is probably immature, as the sporules appear continuous, the bilocular condition showing only when stained. This supports the suggestion made in "Notes" V (p. 698) as to the relationship of the forms on *Actaea*, *Clematis*, and *Thalictrum*. The group is of the same character as the forms referred to on succeeding pages of "Notes" V.

Ascochyta lophanthi var. *lycopina* Davis.

On *Lycopus virginicus*. Bruce. Sporules 20–28 x 7–10 μ , the longer ones sometimes 2–3 septate.

Sporules from loculi of *Phyllachora* on *Calamagrostis canadensis* have been observed. They were fusoid-cylindrical, guttulate, continuous, $16-20 \times 3\mu$. Doubtless a spermogonial state.

Septoria bromi Sacc. On *Bromus altissimus*. Bruce. The record of the occurrence of *S. graminum* Desm. on this host in "Notes" V (p. 694) was based on a very poor specimen and should be canceled.

Septoria verbena Rob. & Desm.

On *Verbena bracteosa*. Wild Rose. Sporules $35-75 \times 1-1\frac{1}{2}\mu$.

Septoria atropurpurea Pk.

On *Aster puniceus*. Sullivan and Spooner.

Sacidium ulmi-gallae Kell. & Sw.

On *Ulmus americana*. Wild Rose.

Record has been made of the occurrence of *Gloeosporium salicis* West. in Wisconsin on willows of European origin. A corresponding Melanconiaceae on the upper surface of the leaves of native willows, however, I am referring to *Marssonina kriegeriana* (Bres.) Magn.

Collections have been made as follows:

On *Salix longifolia*. Madison.

S. discolor. Racine.

S. cordata. Shiocton.

S. syrticola. Two Rivers.

S. petiolaris. Arcadia. On this host the acervuli are hypophylloous, sporules $13-17 \times 3\frac{1}{2}-6\mu$, usually curved, finally septate toward the narrower end.

Marssonina rubiginosa (Ell. & Evht.) which was recorded in "Notes" V is apparently merely a form of this. Examination of a portion of the type collection of *Marsonia nigricans* Ell. & Evht. (Proc. Acad. Nat. Sci. Phila. 1891, p. 84) kindly sent by Pres. Dearness leads me to believe that the host is *Populus balsamifera* and the parasite *Marssonina populi* (Lib.) Magn.

Piricularia grisea (Cke.) Sacc.

On *Leersia virginica*. Blue Mounds and Maiden Rock. *Leersia oryzoides*. Millston. *Leersia* sp. indet. Hixton. *Setaria italica* (cult.) Madison. This fungus appears to be divided into several physiological races. *P. oryzae* Cav. and *P. setariae* Nishikado have

been segregated. (See Nishikado, *Ber. Ohara Inst. landwirtsch. Forsch.* 12:171 *et seq.*) Formosan material on *Leersia hexandra* has been segregated by Sawada under the name *Dactylaria leersiae* but has been referred to *Piricularia* by S. Ito. See *Mycologia* 12: 30, 32.

Cercospora rosicola Pass.

On *Rosa blanda*. Wonewoc. A variable species as one might perhaps expect from the variable character of the hosts. The variation is especially marked in the conidiophores. In this collection they are amphigenous, sometimes scattered or in small tufts, more or less undulate, usually dilated at base, $40-75 \times 3\mu$. *Fungi Columbiana* 3412, on *Rosa blanda*, London, Canada (Dearness) is an extreme form with slender, undulate conidiophores sometimes attaining a length of 150μ . This form with long, slender, more or less spreading and undulate conidiophores I am designating var. *undosa* n. var. The spots on *Rosa blanda* are less definite and orbicular and there is less of the purple discoloration of the surrounding leaf area, but that is probably determined by the character of the tissue of the host.

Cercospora galii Ell. & Hol.

On *Galium asprellum*. Westboro, Bruce, and Nekoosa. The spots are often indeterminate and the conidia tapering. *Cercospora punctoidea* Ell. & Hol. (*in lit.*) was recorded in *A Supplementary List of Parasitic Fungi of Wisconsin*, No. 312 (*Trans. Wis. Acad.* 9: 167), but a description was never published presumably because Mr. Ellis concluded that it was not distinct.

In "Notes" I (p. 90) mention was made of the occurrence of a mucedine on leaves of *Ribes americanum*. What is perhaps the same fungus was collected at Dexterville on spots on leaves of *Ribes prostratum* on the last day of August, 1917. The appearance of the spots suggests that they were caused by *Septoria sibirica* Thuem. but no pycnidia were found. The following notes were made: Tufts amphigenous, scattered, snow white, variable in size; conidiophores hyaline, straight or lax or flexuose, continuous, sometimes branched, $12-45 \times 1\frac{1}{2}\mu$; conidia hyaline, fusiform to cylindrical, straight, continuous, catenulate, $5-22 \times 1-2\mu$.

Thalictrum revolutum should have been recorded as a host of *Entyloma thalictri* Schroet., specimens collected near Racine being upon what I take to be that host species.

Uromyces hyperici-frondosi (Schw.) Arth.

Aecia and uredinia on *Hypericum canadense*. Wild Rose.

The covered leaf rust that was recorded in the provisional list under the name *Puccinia perminuta* Arth. as occurring on *Cinna arundinacea* has been collected on *Cinna latifolia* also at Hixton.

This is now thought to belong to the species bearing aecia on *Impatiens* which has been named *Puccinia impatientis* by Arthur, *P. impatienti-elymi* Arth. by Klebahn and *P. elymi-impatientis* by the writer.

Puccinia graminis Pers.

Telia on *Agropyron tenerum*. Barron (L. S. Cheney).

Puccinia menthae Pers. var. *americana* Burr.

On *Blephilia hirsuta*. Wonewoc.

In the summer of 1917, while collecting along the shore of Lake Michigan at Two Rivers, fasciation of certain branches of *Juniperus horizontalis* was observed such as might be produced by *Gymnosporangium* but quite different from the galls caused by *G. corniculans* Kern which occurs upon this host species. Upon search through the adjacent woods a Roestelia was found upon leaves of Amelanchier having a slender peridium like that of the aecial stage of *Gymnosporangium juvenescens* Kern, a species that occurs on *Juniperus virginiana* in western Wisconsin but which is not known to occur in the eastern part of the state. In May, 1918, a trip was made to the locality and telia were secured with which plants of *Amelanchier canadensis* were infected in the greenhouse the infections resulting in the same type of aecia that had been found the previous summer in the field. In July the locality was again visited and Roestelia on Amelanchier was secured, and the trip extended along the lake shore northward which showed that the rust exists on the beaches with Roestelia in the woods as far north as Bailey's Harbor where the trip ended. Study of the aecia and telia brought the conclusion that the rust is *Gymnosporangium juvenescens* Kern and on submitting specimens to Dr. Kern he concurred in the opinion. As this is not known to occur on *Juniperus virginiana* in eastern Wisconsin, the suspicion arises that there is a race specialized to *Juniperus horizontalis*.

Coleosporium viburni Arth. Telia on *Viburnum pubescens*. Keshena (R. H. Denniston). [Also at Mosinee.]

Onoclea Struthiopteris should have been given as a host of *Sclerotium deciduum* Davis, the pre-sclerotial stage having been collected on that host at Barron in 1907.

ADDITIONAL SPECIES

While collecting along a branch of Main Creek near Hawkins, my attention was arrested by the powdered appearance of the leaves of *Laportea*. After failing to locate wood borers in a position to be responsible for the appearance, a magnifier was used which showed the presence of a *Synchytrium* as the cause. As it seems somewhat different from the forms on various hosts that have been referred to *Synchytrium aureum* Schroet., I have thought it better to keep it separate.

Synchytrium pulvereum n. sp. (Fig. 1).

Galls epiphyllous, discrete, simple, prominent (up to 130μ), contracted at base, at first yellow, then castaneous; resting sporangia single, spherical, castaneous, wall laminated and about 5μ thick, $40-90\mu$ in diameter. On leaves of *Laportea canadensis*.

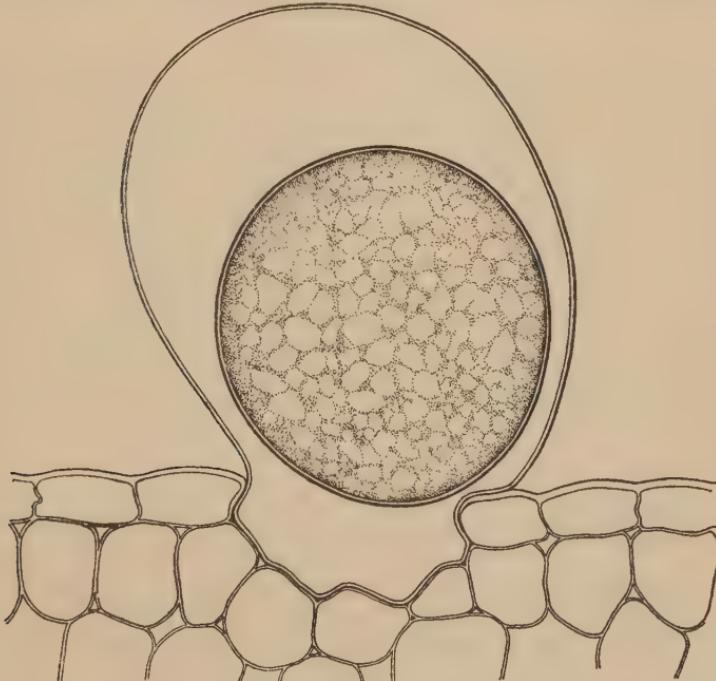


FIG. 1. Vertical section of gall and resting sporangium of *Synchytrium pulvereum* n. sp. Drawn by Charles Drechsler with the aid of camera lucida. Highly magnified.

Hawkins and Bruce. August and September. There are sometimes a few galls on the lower leaf surface, especially on the veins and sometimes on the petiole.

[In examining stained microtome sections of fixed material of this species Miss Dorothy Bradbury and Dr. E. M. Gilbert, under whose direction she was working, detected summer sori. The galls are hypophyllous, prominent, globose, $150-185\mu$ in height and breadth with walls three cells thick proximally, thinning out distally; sporangia probably about 30, spherical to elliptical to polyhedral, averaging about 20μ in diameter.]

Venturia has been observed on leaves of cranberries and blueberries in Wisconsin, but as the material collected was not mature, no determinations and records were made. Shear has reported *Venturia compacta* Pk. as occurring on cranberry leaves in Wisconsin (*Bur. Plt. Ind. U. S. Dept. Agr. Bull.* 110: 45).

Traces of *Taphrina ulmi* (Fckl.) Johans. were observed in June, 1918, on leaves of elm shoots growing along the railroad track in Madison. It has not been seen since.

Septoria polaris Karst.

On radical leaves of *Ranunculus rhomboideus*. Plover and Wild Rose. Of one of the collections referred here the following notes were made: Spots orbicular to elliptical, brown becoming pallid with a brown border, 2-8 mm. long, sometimes confluent; pycnidia epiphyllous, often numerous, scattered, black, globose to ovoid, $80-130\mu$ in diameter; sporules filiform, straight or more often somewhat curved, continuous (?), $24-36 \times 1\mu$. This is the parasite issued under this name in *F. Columbiani* 4878 and *F. exot. exsicc.* 434. It seems closely allied to *S. ficariae* Desm. *S. ficariaecola* Sacc. *S. cymbalaria* Thuem. and *S. ficariooides* Pk.

[Since collected also at Caryville]

Septoria hydrocotyles Desm.

On *Hydrocotyle americana*. Wild Rose and Wautoma.

Septoria coreopsisidis n. sp.

Spots circular or marginal and semicircular, cinereous with a raised margin surrounded by a dark purple zone, 1-2 mm. in diameter; pycnidia punctate, black, scattered, innate, globose, $60-90\mu$; sporules, hyaline, somewhat curved, sometimes gutt-

late, 30–50 x 1–1½ μ . On leaves of *Coreopsis palmata*. Hixton, Wisconsin, September 1, 1917.

Specimens on *Chrysanthemum Leucanthemum* from Bailey's Harbor that I have referred to *Septoria chrysanthemi* Allesch. bear sporules mostly 60–70 μ long.

Leptothyrium pomi (Mont. & Fr.) Sacc.

On fruit of *Pyrus Malus*. Sparta (L. R. Jones).

Gloeosporium equiseti Ell. & Evht.

On *Equisetum* sp. indet. Sullivan. The sporules remind one of the sporidia of *Entyloma*.

Gloeosporium balsameae n. sp. (Plate XXX).

Acervuli hypophyllous, subepidermal, orbicular to oblong, ½–1 mm. in length; sporules hyaline, continuous, fusoid, often inequilateral, seldom curved, 16–33 x 4–6 μ , borne on hyaline basidia of about the same length. The affected leaves have the lethal color throughout, the presence of the fungus being indicated only by the epidermis being slightly raised over the acervuli. This epidermal covering apparently becomes cut away at the periphery and detached in one piece.

On *Abies balsamea*, Clark lake, Door county, July 22, 1918.

Ramularia destructans Zinssmeister and *R. panacicola* Zinssmeister are reported by the author as occurring on roots of *Panax quinquefolium* at Wausau (*Phytopath.* 8: 570).

Ramularia minax n. sp.

Spots small, angular, black, ½–1 mm. in diameter; conidiophores predominantly hypophyllous, subulate to cylindrical, usually continuous, sometimes denticulate near the apex, 6–24 x 2½–3½ μ ; conidia hyaline, straight, fusiform to cylindrical; acute, 10–23 x 2½–4 μ . On leaves of *Solidago rigida*. Buffalo County near Arcadia, Wisconsin, September 5, 1917.

Superficial repent hyphae become closely septate and brown, contorted into brown knots 15–30 μ in diameter, forming superficial tubercularioid pseudostromata from which the conidiophores arise as lateral branches of the component cells, the basal portion of the conidiophore sometimes showing some of the brown color of the cell from which it sprang. Sometimes, however, the brown, or sometimes hyaline, septate hypha is extended along the leaf surface, giving off conidiophores as short lateral branches. Often

the hyphae ascend the trichomes, developing lateral conidiophores and profuse conidia. In the leaf tissue is a fine ($1\frac{1}{2}\mu$) hyaline mycelium which is apparently nonseptate. Macroscopically this fungus resembles *Plasmopara halstedii* (Farl.) Berl. & De Toni, for which it was mistaken in the field. This is another of the *Sporotrichum*-like forms but whether it is a saprophyte, a leaf parasite, or a parasite on *Plasmopara*, I do not know. [In a collection made at Chaseburg in August, 1920, the hyphae are all hyaline and the stromata small, loose, and hyaline. Some of the longer conidia have a median septum, and one was observed having 3 septa.]

Kriegeria eriophori Bres. (*Revue Mycol.* 1891, p. 14, tab. cciii, a-e; *Septoglaeum dimorphum* Sacc. *Syll. Fung.* 10: 497 (1892) and *Ann. Mycol.* 11: 550; *Platygloea eriophori* (Bres.) Hoehn. *Sitz. b. k. Acad. Wiss. Wien* 98: 1157.)

This was collected a number of times on *Scirpus atrovirens* at Racine but not identified. It occurs also at Madison on the same host.

Cylindrosporium artemisiae Dearn. & Barth.

On *Artemisia serrata*. Hixton.

In this collection the sporules are 40-60 μ long.

Ustilago panici-miliacei (Pers.) Wint.

On *Panicum miliaceum* (cult.) Madison (A. L. Stone, 1911; W. N. Steil, 1912), Baraboo (E. H. Toole, 1918).

Under the name *Aecidium smilacinae* (error for *maianthae*) two species of *Aecidium* were confused in the provisional list. One of them, *Aecidium magnatum* Arth., has been connected with a race of *Uromyces acuminatus* Arth. on *Spartina Michauxiana* to which the name *Uromyces magnatus* Arth. has been given (*Mycologia* 9: 309-12). The aecial hosts of this in Wisconsin as far as known at present are *Smilacina racemosa*, *S. stellata*, and *Polygonatum*. The Aecidium on a leaf of *Oakesia sessilifolia* collected at Hancock I am also referring to this species. Of the four races of *Uromyces acuminatus* Arth., three occur in Wisconsin. The least unsatisfactory way of designating these, as it seems to me, is by the use of trinomials, thus:

Uromyces acuminatus magnatus (Arth.)

Uromyces acuminatus steironematis (Arth.) This form appears to be rare in Wisconsin.

Uromyces acuminatus polemonii (Pk.)

The rust on *Trifolium hybridum* referred to *Uromyces trifolii-repentis* (Cast.) Liro is found to be physiologically and to some extent morphologically distinct by W. H. Davis. He therefore separates it under the name *Uromyces hybridii* W. H. Davis (*Trans. Iowa Acad. Sci.* **24**: 472).

Puccinia polygalae Paschke (*P. pyrolae* Cke.).

On *Polygala paucifolia*. Casco and Tomahawk.

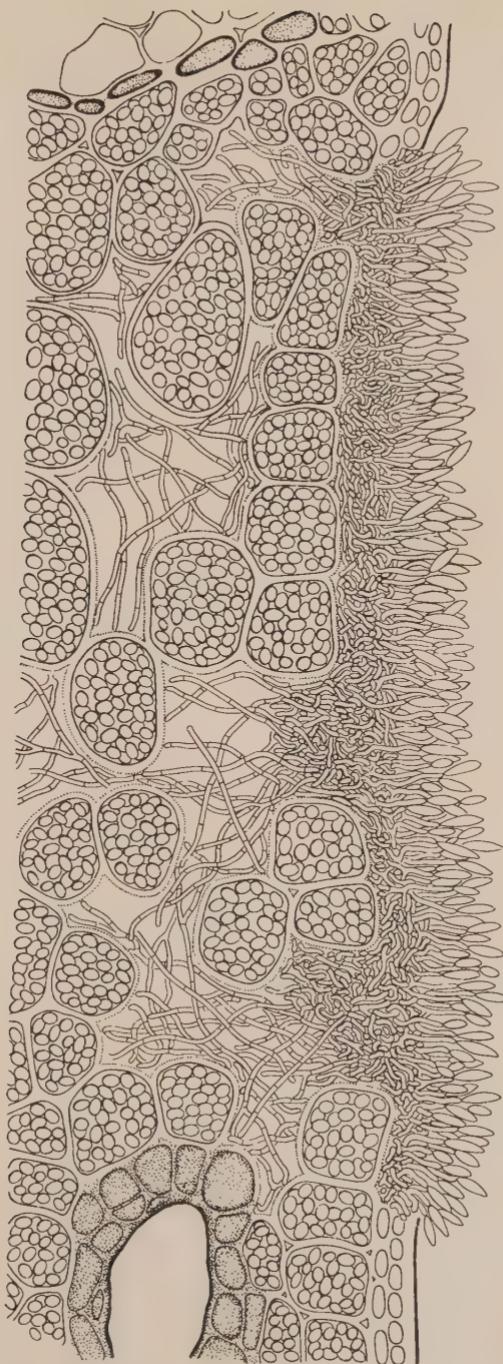
Coleosporium ribicola (C. & E.) Arth.

On *Ribes cynosbati*. Shell Lake and Hayward (C. E. Allen). Price County (R. H. Denniston and W. N. Steil). Uredinia and telia of this Rocky Mountain rust were collected in the course of the white pine rust survey in 1918.

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MADISON, WISCONSIN, MARCH, 1919

PLATE XXX. Vertical section of acervulus of *Gloeosporium balsameae* n. sp. Drawn by Charles Drechsler with the aid of camera lucida. Magnified about 350 diameters.



NOTES ON PARASITIC FUNGI IN WISCONSIN—VIII

J. J. DAVIS

In "Notes" IV (p. 681) it was stated that *Synchytrium cellulare* was confined to a very limited station from which it had disappeared and that it had not been found elsewhere. In 1919 it was rediscovered at Babcock in September, only resting sporangia being present. It was confined to a very limited area. [This has since been collected in other localities.]

Coccochora rubi Davis was abundant at a station on Bruce Creek near Bruce on *Rubus canadensis* in 1918, but, as was so often the case that year, the reproductive bodies were not well developed.

In "Notes" VI (p. 712) it was stated that the sporules of *Septoria acerina* Pk. were borne in acervuli as I had seen the fungus. Material collected at Mellen in 1919, however shows well developed pycnidial walls.

Specimens on Psedera from Wausau and from Nekoosa are referable to *Septoria ampelopsisidis* Ellis, the pycnidial walls being well developed and the sporules long and slender as described for that species. *Septogloeum ampelopsisidis* (Ell. & Evht.) Sacc. seems to be the same fungus with imperfect pycnidial walls and shorter and broader sporules. To the description of *Septoria ampelopsisidia* Ellis the author added the statement: "This approaches *Cylindrosporium* on account of the imperfectly developed perithecia". As the *Septoria* form may be considered the normally developed state, it would be well to use *Septoria ampelopsisidis* Ellis for the aggregate.

The late E. W. Roark found, as a result of an extensive series of inoculations, that *Septoria rubi* West. includes two physiological races: one confined to blackberries (Eubatus), and the other to raspberries. Because of his untimely death, in the military

service, his data have not been published. His death deprived phytopathology of a promising devotee. The results obtained by Beach accord with Roark's findings (*Amer. Jour. Bot.* 6: 26).

I have not seen an authentic specimen of *Ellisiella mutica*, Wint., but it seems probable that the fungus for which I proposed the name *Colletotrichum silphii* (*Trans. Wis. Acad.* 192: 686) is conspecific therewith. If that is the case, of course Winter's specific name should be used unless *Vermicularia silphii* Schw. is the same thing. Both Peck and Ellis doubted the distinctness of *Ellisiella* from *Colletotrichum*.

In the provisional list *Gloeosporium canadense* Ell. & Evht. was included in *G. nervisequum* (Fckl.) Sacc. Investigation, however, by H. R. Rosen and by Eleanor J. Murphy indicates that it is distinct as shown by host relations and by the characters of the Gnomonia stage.

Gloeosporium leptospermum Pk. collected at Mosinee June 23, 1918, bears sporules but $10-13 \times 3\mu$. The small size of the sporules might be attributed to immaturity but some of them had already oozed out in masses. This seems to be connected with *Cryptomyces pteridis* (Reb.) Rehm.

While Marssonina as it usually occurs on the aspens bears hypophyllous acervuli and small sporules in material collected at Mercer on *Populus tremuloides* the acervuli are epiphyllous and the sporules are about $18 \times 10\mu$. A specimen from Fish Creek on *Populus balsamifera* has epiphyllous acervuli containing sporules $20-26\mu$ long.

Myrioconium comitatum Davis has been collected on leaves of *Populus tremuloides* that bear no *Sclerotium bifrons* Ell. & Evht. The large, dead, sharply delimited leaf areas are like those on which the *Sclerotium* occurs. In this collection the *Myrioconium* is scattered more generally over the leaf surface than usual.

In compiling the provisional list the names of four hosts were placed under *Ramularia rufomaculans* Pk., namely, *Polygonum aviculare*, *P. amphibium*, *P. Muhlenbergii*, and *P. ciliinode*. The plant on *P. aviculare* is *Ovularia rigidula* Delacr. (*O. avicularis* Pk.) with conidiophores varying in length up to 80μ and conidia $10-18 \times 4-6\mu$. The leaves in the specimens on *P. ciliinode* are

spotted, but the spots are those caused by *Septoria polygonorum* Desm., and the Mucedine, which is apparently superficial, and perhaps saprophytic, is confined to these spots. I have collected this several times on *Septoria* spots on *Polygonum cilinode*. *Polygonum aviculare* and *P. cilinode*, should therefore be stricken from the list of hosts of *Ramularia rufomaculans* Pk. On *Polygonum amphibium* and *P. Muhlenbergii* the conidial fasciculi appear on the lower surfaces of the leaves before the leaf tissues die and become brown, that is, before leaf spotting is apparent. In the leaves of *Fagopyrum esculentum* the tissue death proceeds more slowly and the appearance of the leaves would not lead one to suspect the presence of the fungus until a late stage of the attack. The same is true of *Polygonum scandens* which is also a host in Wisconsin. It was apparently the absence of spotting that led Peck to give the name *Ramularia anomala* to the form on this host. The thin, firm leaves of these hosts seem to succumb more slowly to the attack of the parasite than do the thicker leaves of *Persicaria*. In July 1920 a collection was made at Caryville on *Polygonum Convolvulus* that seems referable to *Ramularia anomala* Pk. The hypophylloous tufts are effused over indefinite areas or over the entire leaf surface; conidiophores densely fasciculate, hyaline, straight, $6-15 \times 1-2\mu$; conidia hyaline, catenate, more or less acute, straight, continuous, $4-20 \times 1\frac{1}{2}-2\frac{1}{2}\mu$. Some of the shorter conidia are ellipsoid and of the *Ovularia* type.

In August 1920 there was collected in small quantity at Chaseburg a *Ramularia* on *Polygonum Persicaria* in which the areas bearing the tufts are not at first discolored but become pale brown the discoloration showing more plainly after the leaf is dried. The conidia are but $1-1\frac{1}{2}\mu$ thick. It is quite likely that the forms on *Persicaria*, *Tiniaria*, and *Fagopyrum* will prove to be distinct in their host relations. Dr. F. R. Jones failed to infect *Fagopyrum* using conidia from *Polygonum scandens*. The conidiophores and conidia are sometimes more slender ($1\frac{1}{2}-2\mu$) than the descriptions indicate. *Ramularia occidentalis* Ell. & Evht. on *Rumex* is a closely related species. I have seen this only on the single species of host, *Rumex britannica*, on which it is sometimes abundant.

I offer the following characterization of the growth on *Polygonum cilinode*:

***Ramularia cilinode* n. sp.**

Hypophylloous on *Septoria* spots; conidiophores arising from more or less intricate superficial mycelial ganglia, erect or as-

surgent, hyaline, straight or somewhat curved, 30–50 x $1\frac{1}{2}$ – $2\frac{1}{2}\mu$; conidia apical, hyaline, subacute, straight, continuous, 18–45 x $1\frac{1}{2}$ – $2\frac{1}{2}\mu$. On *Polygonum cilinode*, Hannibal, July 24, 1920, (type), Cadott July, 28, 1920, "conidia 15–35 x 2–3 μ "; Holcombe, August 7 and 8, 1920; Radisson, July 7, 1906. Also Mountain, Ellison Bay, Solon Springs, Black River Falls, and Necedah. June and July. The fungus has been found on *Polygonum cilinode* only and confined to the Septoria spots on which it shows as a delicate white mold.

Ramularia umbrina Davis (*Trans. Wis. Acad.* **192**: 714) should, I think, be considered a synonym of *R. diervillae* Pk.

The fasciculi of *Cercospora rhamni* Fkl. are described as oliveaceous, but in Wisconsin on both *Rhamnus cathartica* and *R. alnifolia* they are often a decided rusty brown because of the color of the conidiophores which are 40–65 μ long.

Cercospora clavata (Ger.) Pk. is a common and variable parasite of *Asclepias* in Wisconsin. What I take to be a form of this on *Asclepias syriaca* causing pale orbicular spots is of the character of *Cercospora asclepiadis* Ellis (*Amer. Nat.* **16**: 810, 1890), *C. asclepiadis* Henn. (*Hedwigia* **41**: 309, 1902), and *C. venturioides* Pk. Conidiophores sometimes exceed 100 μ .

Ramularia ionophila Davis was given specific rank largely because it appeared to be confined to the single species of violet, *Viola canadensis*, in Wisconsin. However, a collection on *Viola ocellata* made at Paradise, California, by F. R. Jones seems referable to this species. *Ramularia biflorae* Magn. is the European analogue to which perhaps the American form should be referred.

I have not seen an authentic specimen of *Ramularia rubicunda* Bres., but judging from the description *Cercospora subsanguinea* Ell. & Evht. can scarcely be distinct.

Arthur and Bisby (*Proc. Amer. Philos. Soc.* **57**: 201) found that Schweinitz's *Caeoma (Uredo) teucrii* as represented in the Schweinitz herbarium is *Ramularia racemosa* Ell. & Mart., and propose the binomial *Cercospora teucrii* (Schw.) Arthur & Bisby. As I understand it, the object of rules in nomenclature is to secure uniformity of usage. As all determined specimens of *Cercospora racemosa* were so labeled in all herbaria such uniformity has been secured and I see no occasion for changing all the labels. This

is apart from the matter of the validity of Schweinitz's description which is certainly open to question.

In the provisional list *Rubus idaeus aculeatissimus* is given as a host of *Gymnoconia peckiana* in the Caeoma stage. This is perhaps an error as I can find no specimen that I am sure is on a red raspberry and since my attention has been called to the matter I have seen no instance in the field. The host characters are usually modified in infected plants and determination often difficult.

A collection of *Aecidium monoicum* Pk. on *Arabis lyrata* made by J. M. Holzinger at Trempealeau on the Mississippi River was referred to in the appendix to the provisional list. It was collected in 1918 on the same host at Two Rivers on the shore of Lake Michigan.

Kuehneola uredinis (Lk.) Arth. (*K. albida* (Kuehn) Magn.), as I have seen it on *Rubus hispida*, forms telia on the overwintered leaves in the spring quickly followed by aecia (*Uredo muelleri* Schroet.) on the young leaves of the season. The sequence suggests that it is living mycelium that carries the rust through the winter. [In 1921 telia were observed on this host in September.]

ADDITIONAL HOSTS

Upon which the fungi mentioned have not been recorded as occurring in Wisconsin.

Synchytrium aureum Schroet. On leaves and especially petioles of *Rudbeckia laciniata*. Bruce. I am applying to this the designation that has been used for similar forms on other hosts in Wisconsin. The sori lose their yellow color before maturity. They are often subepidermal on this host as on some others. The development of the sorus in the mesophyll I have thought might be due to a very firm cuticle, but that explanation does not seem a very probable one as regards this host. A collection made at Prentice on *Petasites palmatus* I have also referred to this species.

Albugo candida (Pers.) O. Kuntze. On *Arabis glabra*. Mosinee.

Sphaerotheca humuli (DC.) Burr. var. *fuliginea* (Schl.) Salm. On *Bidens vulgata*. Madison.

Salmon in his studies of the Erysiphaceae encountered specimens from South Dakota and Wyoming on *Vicia* for the reception of which he proposed the variety *ludens* of *Microsphaera alni* (Wallr.) Wint. Material of similar character has been collected at Nekoosa on *Desmodium paniculatum* (Fig. 1) and referred to this variety. Recurved appendage tips are not abundant.



FIG. 1. Outlines of selected appendage tips of *Microsphaera alni ludens* from leaf of *Desmodium paniculatum*. Camera lucida drawing by Paul A. Harvey. Magnified about 265 diameters.

Erysiphe graminis DC. Conidia on *Dactylis glomerata*. Fish Creek.

Phyllachora was abundant on *Andropogon furcatus* at Chetek in September, 1918, but immature. Phyllachora on *Melica striata* was collected at Mosinee in September, 1919, also immature, but the characters of the ascomata are not those of *Ph. melicicola* Speg.

A collection on *Oakesia sessilifolia* referred to *Phyllosticta cruenta* (Fr.) Kickx bears sporules 15–20 x $3\frac{1}{2}$ – 6μ .

Ascochyta clematidina Thuem. var. *thalictri* Davis. On *Thalictrum dasycarpum* Saxon. In this collection the sporules are 10–17 x 3–4 μ , thus approaching the type on Clematis. In the reference to this variety in "Notes" V the page number should be 557 instead 757 as printed.

Ascochyta pisi Lib. On leaves of *Vicia caroliniana*. Fish Creek. In this collection the pycnidia range up to 175 μ in diameter with tenuous, transparent walls, the ostiole hypophyllous, the sporules 17–30 (mostly about 23) x 3– $3\frac{1}{2}\mu$. In specimens on *Vicia americana* the ostiole is epiphyllous.

Septoria malvicola Ell. & Mart. On *Althaea rosea* (cult.) Devil's Lake (I. Jorstad). From this collection the following notes were made: Spots blackish brown above, angular, limited by the veinlets, sometimes confluent, central portion bearing the pycnidia becoming pale brown or sordid white, paler and less distinct below, about 2 mm. in diameter; pycnidia epiphyllous, scattered, globose, $85-100\mu$ in diameter; sporules hyaline, acute at one end, some of them very faintly triseptate, $24-40 \times 1\frac{1}{2}-2\mu$. This is *Septoria fairmani* Ell. & Evht., which Beach has found to be not distinct (*Amer. Jour. Bot.* 6: 15-16).

Septoria convolvuli Desm. On *Convolvulus spithameus*. Mosinee. Sporules acicular, straight or somewhat curved, $30-40 \times 1-2\mu$, appearing continuous. (See Beach, *loc. cit.* 16-19.)

Of a collection on leaves of *Aster Tradescanti* made at Saxon and referred to *Septoria atropurpurea* Pk. the following notes were made: Spots suborbicular, dark brown with a purple border above, paler and immarginate below, about 5 mm. in diameter; pycnidia innate, globose, $125-165\mu$; sporules curved, $50-96 \times 3\mu$. What appears to be the same species was collected also on *Aster puniceus*.

Phleospora reticulata Ell. & Evht. On *Vicia americana*. Mosinee. In this collection the dark border lines of the spots are narrower and less conspicuous or even wanting and the sporules but $2-3\mu$ thick. A collection on *Lathyrus venosus* from the same station bears filiform, curved sporules up to 125μ long by about $1\frac{1}{2}\mu$ thick. Apparently a poorly developed state.

Ribes Cynosbati, *R. gracile*, and *R. oxyacanthoides* should be added to the list of hosts upon which *Gloeosporium ribis* (Lib.) Desm. & Mont. occurs in Wisconsin.

Colletotrichum solitarium Ell. & Barth. On *Solidago speciosa* and *S. nemoralis* Nekoosa.

Cylindrosporium eminens Davis. On *Helianthemum majus*. Chetek.

Record was made in "Notes" VI (p. 708) of the occurrence of *Ramularia alismatis* Fautr. on *Sagittaria heterophylla* at Arcadia. It has since been found on the same species of host at Shioc-ton and Chetek. As was suggested in "Notes" I (p. 84), this

should not be referred to *Ramularia* but belongs under the rubric *Micronemeae*. An undifferentiated hypha makes its way to a stoma where it bears upon its extremity a conidium. In surface view the conidia appear to be standing on end on the leaf surface. They are easily detached, hence in examining sections they are seen not *in situ* but floating free in the mounting fluid. A similar mode of development is found in the fungus to which Oudemans gave the name *Marsonia secales* and upon which Heinsen founded the genus *Rhynchosporium*. To this genus therefore I would refer the fungus on *Alisma* and *Sagittaria heterophylla*, considering the bending of the apical portion of the conidium to one side in the type as of no more than specific import. Diedicke (*Ann. Mycol.* 10: 479) states that the specimens of *Septoria alismatis* Oud. that he has examined are of the same character as *Ramularia alismatis* Fautr., which is true of those that I have seen, including *North American Fungi*, second series, 3371, collected in Canada by Dearness. *Rhynchosporium* Heinsen then, being emended to include all *Mucedinaceae* *micronemeae* *hyalodidymae*, would contain at present two known species:

***Rhynchosporium secales* (Oud.) n. comb.**

Marsonia secales Oud.

Rhynchosporium graminicola Heinsen

Collected in Wisconsin on the following hosts by A. G. Johnson, J. G. Dickson, and C. Drechsler:

Dactylis glomerata

Agropyron repens

Hordeum vulgare

Hordeum distichum

Hordeum hexastichum

Secale cereale

Bromus inermis

***Rhynchosporium alismatis* (Oud.) n. comb.**

Septoria alismatis Oud.

Ascochyta alismatis Ell. & Evht.

Ramularia alismatis Fautr.

Didymaria aquatica Starb.

On *Alisma Plantago-aquatica* and *Sagittaria heterophylla*.

Cylindrosporium bandysianum Sacc. on *Alisma Plantago* (*Ann. Mycol.* 12: 296) judging from the description is probably the same fungus.

The conidiophores of *Ramularia sagittariae* Bres. were described by the author as being short branched or forked, septate, 25–26 x 3–5 μ . (*Hedwigia*, 1896, p. 200). In my examination of Krieger's *Fungi saxonici* 1294 issued under this name, I did not find such conidiophores but instead sessile conidia similar to those that are found in Wisconsin on *Sagittaria heterophylla*.

Ramularia impatientis Pk. is also micronematous but the conidia are not septate and are often clustered reminding one of *Microstroma*.

Ovularia pulchella (Ces.) Sacc. var. *agropyri* Davis. On *Agropyron repens*. Fish Creek.

Ramularia rosea (Fckl.) Sacc. On *Salix glaucocephala*. Nekoosa.

Ramularia virgaureae Thuem. On *Solidago speciosa*. Nekoosa. Conidia 30–96 x 3–5 μ , 1–5-septate, cylindrical to obclavate.

Of a specimen on *Solidago serotina* collected at Saxon it was noted: Conidiophores 20–50 x 4 μ ; conidia 40–100 x 4 μ , the longer somewhat tapering. Leaves at first unspotted but showing small dead areas later.

Piricularia parasitica Ell. & Evht. On Phyllachora on leaves of *Elymus canadensis*. Cornell.

Cladosporium nervale Ell. & Dearn. On *Rhus typhina*. Ellison Bay and Nekoosa. Specimens on *Rhus glabra* were recorded under *Cladosporium aromaticum* Ell. & Evht. in the provisional list.

Cercospora muhlenbergiae Atk. On *Muhlenbergia foliosa*. Cornell.

Cercospora vexans C. Massal. Collected in small quantity on *Fragaria vesca* Mellen. This fungus is common on *F. virginiana* in the woods in northern Wisconsin.

Cercospora rosaecola Pass. var. *undosa* Davis. On *Rosa humilis*. Nekoosa.

Cercospora violae Sacc. On *Viola conspersa*. Mosinee. The spots are reddish brown before becoming pallid.

Cercospora osmorrhizae Ell. & Evht. On *Osmorrhiza Claytoni*. Mellen.

Cercospora varia Pk. On *Viburnum pubescens*. Bruce. In this collection the conidiophores are 20–30 x 4–6 μ , the conidia 60–130 x 3 μ . The fasciculi are mostly epiphyllous. As remarked by Ellis and Everhart (*Jour. Mycol.* 1: 63), this seems doubtfully distinct from *C. tinea* Sacc., but I have not seen European specimens. The petioles of the leaves of the host in this collection are 2 cm. long.

Cercospora helianthi Ell. & Evht. On *Helianthus strumosus*. Nekoosa. In a collection on *H. occidentalis* from the same locality, the conidiophores are mostly epiphyllous on small, immarginate purple spots.

Entyloma crastophilum Sacc. On upper leaves and axis and branches of the panicles of *Glyceria pallida*. Chetek. This is the only indigenous grass upon which I have seen this species.

Uromyces fabae (Pers.) DBy. Uredinia and telia on *Vicia caroliniana*. Fish Creek. Aecia and uredinia were present on *Lathyrus palustris* in the same locality but on the opposite side of the bay. Uredinia on *Vicia caroliniana*. Nekoosa.

Telial material of *Uromyces acuminatus magnatus* (Arth.) on *Spartina Michauxiana* collected at Hancock in October, 1918, and wintered out of doors infected *Smilacina stellata*, *S. racemosa*, *Polygonatum commutatum*, *P. biflorum*, and *Oakesia sessilifolia* in the greenhouse in May, 1919. *Uvularia grandiflora* and *Convalaria majalis* proved immune. Two plants of *Oakesia* were brought in from the woods and exposed to infection. One was a vigorous, growing plant having seven leaves. Every leaf of this plant was thoroughly infected, as shown by the abundant spermogonia, with the result that they withered and died without forming aecia except at the base of the lowest leaf. The other plant was stunted, having but three leaves which seemed old and firm. This plant was but slightly infected, but bore aecia on a spot on one of the leaves.

Having some overwintered telial material of *Puccinia stipae* Arth. on *Stipa spartea* which germinated with unusual vigor, a young plant of *Aster multiflorus* was brought into the greenhouse and exposed to infection. The result was thought to be negative, but before discarding the Aster plant it was examined carefully and two very small aecial spots were found, one bearing one cup, the other three. These spots were on the leaf edge.

Puccinia poarum Niels. Uredinia on *Poa triflora*. Bruce.

Puccinia agropyri Ell. & Evht. Uredinia on *Agropyron caninum*. Mosinee.

Puccinia eriophori Thuem. Telia on *Eriophorum viridicarinatum*. Weyerhaeuser.

Puccinia polygoni-amphibii Pers. A single aecial spot, but a well developed one, on *Geranium Bicknellii*. Mosinee.

Epiphyllous telia on *Ledum groenlandicum* collected at Sturgeon Bay have been referred to *Melampsoropsis ledicola* (Pk.) Arth. because of their location on the upper surface of the leaf.

ADDITIONAL SPECIES

Not hitherto recorded as occurring in Wisconsin.

Sphaerotheca pannosa (Wallr.) Lev. has been collected a few times at Madison on cultivated roses, but it does not seem to maintain itself.

A collection of *Cercospora comari* Pk. on *Potentilla palustris* from Nekoosa bears also a Mycosphaerella that I have referred to *M. innumerella* (Karst.). The globose black perithecia are closely and regularly placed on the lower surface of the black spots and are $70-85\mu$ in diameter; the asci are $33-47 \times 7\mu$, and the fusoid-cylindrical, hyaline, uniseptate spores $13-18 \times 2\frac{1}{2}-3\mu$. The collection was made in July and probably at full maturity would give larger measurements. It appears to be genetically connected with the *Cercospora*.

Sphaerulina pallens n. sp.

On large, pale, dead, mostly terminal, leaf areas; perithecia epiphyllous-innate, scattered, black, globose, about 150μ in diameter; asci clavate-cylindrical, short-stipitate, more or less curved, apapophysate, $75-85 \times 10\mu$; spores distichous, subfuligineous, fusoid-cylindrical, 5-9 septate, $30-60 \times 3-4\mu$.

On *Carex* sp. indet. A large coarse species. Mellen, Wisconsin, July 31, 1919.

Acanthostigma occidentalis (Ell. & Evht.) Sacc. On leaves of *Cirsium discolor*. Black Earth and Madison (I. Jorstad).

Phacidium planum n. sp. (Plate XXXI.)

Apothecia foliicolous, seriate, sometimes confluent, erumpent, little prominent, overlying epidermis circumscissile; disk plane, pale brown or sordid, surrounded by black hyphae; asci clavate, octosporous, $50-80 \times 9-12\mu$; spores inordinate, clavate to fusoid-cylindrical, acute at base, hyaline, continuous, $30-40 \times 3\mu$, paraphyses filiform, about as long as the asci. On languishing leaves of *Pinus Strobus*. Mosinee, Wisconsin, July, 1919. The asci and spores suggest those of *Hypoderma*.

Phacidium expansum n. sp. (Plate XXXII.)

Apothecia foliicolous, scattered, erumpent, expanding, $\frac{1}{4}-\frac{1}{3}$ mm. in diameter, surrounded by a wall composed of black hyphae which are adnate proximally but free distally; asci clavate-cylindrical, narrow at base, octosporous, $60-80 \times 7-9\mu$; spores monostichous, elliptical, hyaline, continuous, $9-12 \times 3-5\mu$; paraphyses numerous, filiform, thicker toward the apex, slightly longer than the asci. The infected leaves, which are scattered, are killed before the apothecia appear. On leaves of *Picea mariana*. Ogema, Wisconsin, July 29, 1919.

Phacidium balsameae n. sp.

Apothecia flat, circular, subepidermal, exposed by circumscissile removal of the overlying epidermis, becoming prominent, surrounded on the sides by a wall of more or less conglutinated parallel black hyphae, about 350μ in diameter; asci cylindrical, narrowed to the base, straight or the peripheral ones somewhat incurved, $80-100 \times 10\mu$; spores ovoid, hyaline, obliquely monostichous, $12-14 \times 6-7\mu$; paraphyses filiform, a little longer than the asci. On scattered leaves of *Abies balsamea*, which become brown and dead. Vilas County, Wisconsin, July 27, 1902.

The three foregoing species are brought together here for the purpose of calling attention to them rather than to indicate their exact systematic position.

Lophodermium thuyae n. sp. (Fig. 2, page 425.)

Perithecia epiphyllous, black, hysteriiform, outer wall thickened toward the sulcus; asci cylindrical, narrowed to the base, $80-100 \times 10\mu$; spores 8, filiform, parallel, approximating in length that of the ascus; paraphyses filiform, distally flexuous or contorted, as long as the asci. On *Thuya occidentalis*. Saxon, Wisconsin, August 16, 1919.

***Hypoderma brachysporum* (Rostr.) Tubeuf.**

On leaves of *Pinus Strobus* attached to dead twigs. Mosinee. I have seen no septation of the spores. The classification of this group is unsatisfactory.

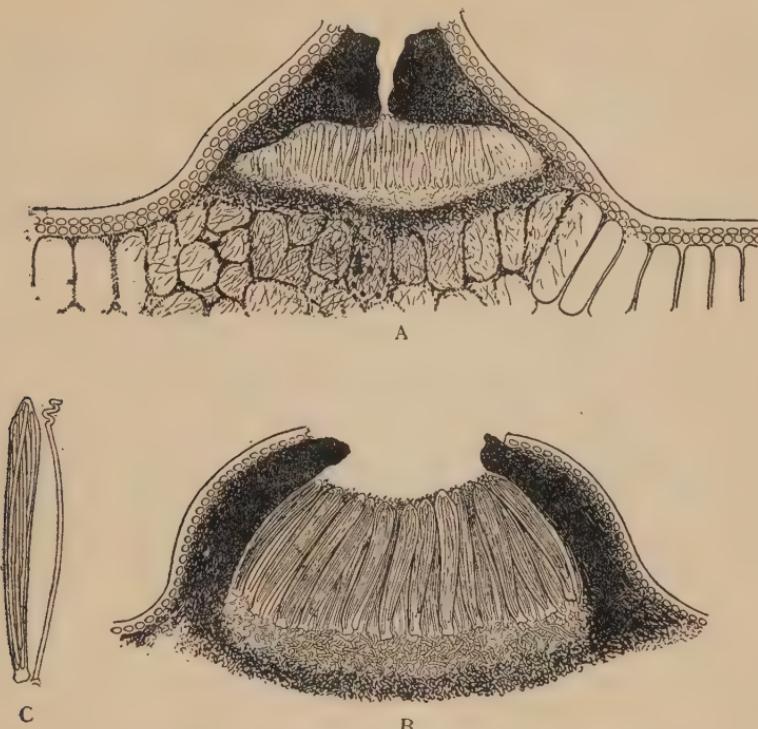


FIG. 2. A. Vertical section of an immature peritheium of *Lophodermium thuyae* n. sp., showing unusual thickening of the upper wall. Magnified about 150 diameters. B. Vertical section of a mature peritheium of the same. C. An ascus and paraphysis magnified about 350 diameters. Drawn with the aid of camera lucida by Charles Drechsler.

Phyllosticta platanoïdis. Sacc.

On *Acer Negundo*. Madison.

Phyllosticta bacteriospora Vuill.

On *Tilia americana*. Mellen.

What is perhaps *Asteroma populi* Rob. & Desm. has been collected at Mellen on *Populus tremuloides*. The material is young and the "fibrils" are not yet black.

Stagonospora arenaria Sacc.

To this species I have referred collections on leaves on *Elymus canadensis* from Mellen. The leaves bear blackish brown spots, but the pycnidia are found also in paler portions of the leaves. The sporules are $20-33 \times 3-4 \mu$, triseptate. Exceptionally 1-, 4-, or 5-septate sporules occur.

***Stagonospora tetramera* n. sp.**

Spots pale brown to sordid with a darker brown, indefinite margin, paler and usually immarginate below, oblong to elliptical, about 1 cm. long, sometimes confluent; pycnidia scattered, epiphyllous-innate, black, ostiolate, globose to depressed-globose, $100-150\mu$ in diameter; sporules hyaline with coarsely granular cytoplasm, fusoid-cylindrical, obtuse and rounded at both ends, straight, triseptate, $55-75 \times 10-13\mu$. On leaves of *Carex (riparia?)* Madison, Wisconsin, September 16, 1919.

***Stagonospora petasitidis* Ell. & Evht.**

On *Petasites palmatus*. Prentice. Sporules about 4μ thick.

***Septoria angustifolia* Ell. & Evht.**

On *Kalmia polifolia*. Mercer. In the collection referred to this species provisionally the spots are castaneous above, 2-5 mm. in diameter or sometimes longer when running along the leaf margin and the sporules are $30-60 \times 1-1\frac{1}{2}\mu$. The "white-glaucous", appearance of the lower surfaces of the leaves of the host is due to the numerous small white trichomes.

***Septoria xylostei* Sacc. & Wint.**

Specimens on *Lonicera canadensis* collected at Saxon have been referred to this species.

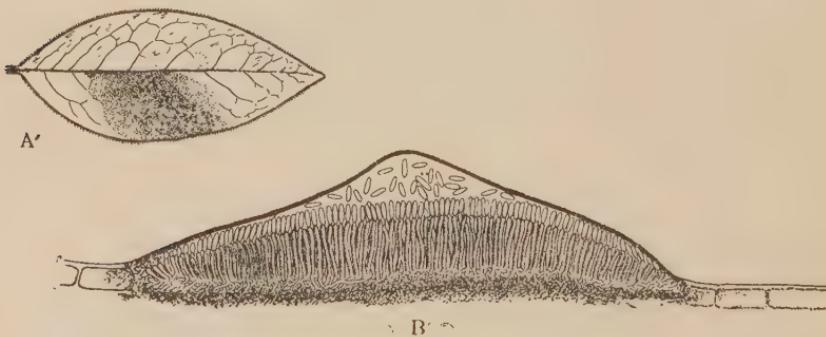


FIG. 3. A. A leaf of *Vaccinium canadense* bearing *Piggotia vaccinii* n. sp. Natural size. B. Vertical section of a pycnidium of the same magnified about 350 diameters. Drawn by Charles Drechsler with the aid of camera lucida.

***Piggotia vaccinii* n. sp. (Fig. 3.)**

Spots suborbicular to semi-elliptical, reddish brown becoming paler and often mottled above, subolivaceous below, 1-2 cm. in length, sometimes confluent; pycnidia epiphyllous, scattered,

black, flattened, orbicular, astomous, irregularly rugose, $140-200\mu$; sporules hyaline, oblong to short cylindrical, $2-6 \times \frac{1}{2}-1\mu$; sporophores hyaline, filiform, straight, constipate, about 12μ long. On leaves of *Vaccinium canadense*. Tomahawk, Wisconsin, August 25, 1919. The spots usually extend from the leaf margin to the midrib, but are sometimes terminal and sometimes include nearly the entire leaf. The clypeus is membranous and often punctulate as in *Sacidium* or finely rugulose.

***Gloeosporium bicolor* n. sp.**

Spots circular to irregular, immarginate, olivaceous, sometimes confluent, $\frac{1}{2}-2$ cm. in diameter, with a sterile, reddish brown central portion 2-4 mm. in diameter; acervuli hypophyllous, small, subolivaceous, scattered on the olivaceous portion of the spot; sporules, hyaline, fusoid-cylindrical, rarely curved, continuous, $7-26 \times 3-6\mu$, basidia short or obsolete. On leaves of *Quercus bicolor*. Chippewa Falls, Wisconsin, September 14, 1918. The central portion of the spot resembles that caused by *Marssonina martini* (Sacc. & Ell.) Magn.

***Gloeosporium ramosum* Ell. & Evht.**

On *Polygala sanguinea*. Nekoosa. In this collection the acervuli are mostly on the stems, speedily killing the host. The sporules are $8-13\mu$ long, mostly more or less lunate.

***Gloeosporium fraxineum* Pk.**

On *Fraxinus pennsylvanica*. Mosinee. *Gloeosporium irregularare* Pk. is evidently not distinct from *G. aridum* Ell. & Hol.

***Colletotrichum magnisianum* Bres.**

On *Malva rotundifolia*. Madison (A. C. Foster). Referred to this species because of the host. In this collection the spots are not white and arid but brown and subindefinite, the acervuli bright cinnamon brown, the sporules $10-14 \times 4-5\mu$, the setae less numerous than in typical *C. malvacearum* (Br. & Casp.?) Southworth. A specimen on the same species of host from Maryland (C. A. Schwarze, May 22, 1919) bears setae up to 100μ in length.

Spiraea tomentosa was given as a host of *Septoria salicifoliae* (Trel.) in the provisional list and the character of the fungus on this host referred to in the appendix (*Trans. Wis. Acad.* **17**: 983-984). It appears to be distinct from *Cylindrosporium salicifoliae* (Trel.) Davis, and should doubtless be referred to *Cylindrosporium spiraeicolum* Ell. & Evht. When the sporules become free the flagelliform basal portion is usually curved. As *C. spiraeicolum* was founded on material from Idaho I was led to re-ex-

amine a collection on *Spiraea densiflora* (given as *S. corymbosa*?) made at Wallace, Idaho, and referred to *Septoria salicifoliae* Trel. in *Trans. Wis. Acad.* 152: 776. In this collection the acervuli are epiphyllous as in *C. spiraeicolum* Ell. & Evht., but the sporules are of the *C. salicifoliae* type but unusually long and slender (50–100 x 2–3 μ) and mostly but little curved. This may prove to be distinct.

Ramularia repens Ell. & Evht.

On *Aralia nudicaulis*. Nekoosa.

Macroscopically this is indistinguishable from *Cercospora leptoisperma* Pk.

Ramularia magnusiana (Sacc.) Lindau.

On *Trientalis americana*. Prentice. In this collection the conidiophores spring from black, scattered, stromatoid tubercles.

Cercospora dearnessii Bubak & Sacc.

On *Solidago altissima*. Madison. In this collection the conidiophores are but 30–50 μ long. Very long (up to 180 μ) and slender conidia occur as well as short ones. They are sometimes bent. This seems to be close to the variable *Ramularia virgaureae* Thuem.

***Cladosporium astericola* n. sp.**

Spots small, brown, indefinite, 1–4 mm. in diameter; conidiophores mostly hypophyllous, fuligineous, scattered or somewhat fasciculate, erect or assurgent, straight or curved, denticulate, 1–4-septate, constricted or not at the septa, 40–75 x 3–4 μ ; conidia acro-pyrogenous, fuscous, catenate, fusoid to subcylindrical, uniseptate, 10–20 x 3–5 μ . On upper leaves and upper portions of stems of *Aster umbellatus*. Mellen, Wisconsin, August 4, 1919.

Cercospora ranunculi Ell. & Holw.

On *Ranunculus septentrionalis*. Saxon. In this collection the conidiophores, which spring from black stromatoid tubercles, are shorter (30–65 μ) and straighter than those of the type as described.

In the provisional list a *Cercospora* occurring on *Spiraea salicifolia* was doubtfully referred to *Cercospora rubigo* Cke. & Hark. As I have not seen an authentic specimen of this species and the description is meager and not quite congruous I give some notes on the parasite that occurs in Wisconsin.

On suborbicular to angular areas which become reddish brown above, darker and finally granulose below; conidiophores hypophyllous, brown, subdecumbent to erect, bent or more tortuous and more or less torulose, sometimes branched, occasionally septate, $50-100 \times 3\mu$; conidia hyaline, obclavate to flagelliform, more or less curved, becoming septate, $65-135 \times 3\mu$. On leaves of *Spiraea salicifolia*. Nekoosa, Wisconsin, July 25, 1919. Macroscopically the conidial masses are grey. In the provisional list a specimen on *Spiraea salicifolia* was doubtfully referred to *Cercospora rubigo* Cke. & Hark. This specimen was collected at Spooner July 20, 1911, and in the packet I find the following description: Spots angular to suborbicular, limited by the veinlets, reddish brown, 5-8 mm. in diameter; conidiophores hypophyllous, fuligineous, assurgent to erect, often arising as branches from a superficial creeping mycelium, sometimes branched, usually crooked and denticulate or nodulose, $25-60 \times 3\mu$; conidia hyaline, attenuate from about 10μ above the base where the diameter is greatest, straight or more often somewhat curved, pluriguttulate, $50-125 \times 3-4\mu$.

Cercospora medicaginis Ell. & Evht.

On *Medicago lupulina*. Madison (F. R. Jones). The type of this species was probably immature as the mature conidia become flagelliform and $100-165\mu$ in length.

Cercospora flagellifera Atk.?

Of what is perhaps a northern form of this species the following notes were made: Spots few, scattered, definite, angular, dark reddish brown above, lighter brown below, 2-5 mm. long; conidiophores amphigenous, fuscous, closely fasciculate, usually straight, simple, continuous, $17-40 \times 3\mu$; conidia hyaline, obclavate, straight or somewhat curved, septate, $55-80 \times 3-4\mu$. On leaves of *Lespedeza capitata*. Saxon, July 25, 1919. Nekoosa, July 17 and 19, 1919.

Cercospora gaultheriae Ell. & Evht.

On *Gaultheria procumbens*. Millston.

Cercospora tuberculella n. sp.

On small, angular, somewhat paler areas, limited by the veinlets, which finally become black; conidiophores hypophyllous, fasciculate from scattered, black substomatal pseudo stromata, fuligineous, straight to subundulate, simple, sometimes with a single septum, $20-50 \times 4-6\mu$; conidia dilute fuligineous, cylindrical to obclavate-cylindrical or occasionally fusoid-cylindrical, obtuse, usually straight, becoming 1-3-septate, $30-60 \times 4-6\mu$. On leaves of *Convolvulus sepium*. Madison, Wisconsin, September 16, 1919. This collection is peculiar because of the very abundant, much

branched, tortuous intrafoliar mycelium which is seldom filamentous but usually nodulose to moniliform. It is possible that this will prove to be a form of *Cercospora convolvuli* Tracy & Earle (*Bull. Torrey Bot. Club* 27: 187).

***Cercospora tortipes* n. sp.**

On indefinite leaf areas or entire leaves which finally become dead; fasciculi small, scattered, mostly hypophyllous; conidiophores fuligenous, usually divaricate, tortuous and denticulate, sometimes septate, seldom branched, $30-60 \times 3\mu$; conidia hyaline, obclavate-cylindrical, straight or somewhat curved, $50-130 \times 3\mu$. On leaves of *Veronica scutellata*. Bruce, Wisconsin, September 4, 1918.

***Cercospora tabacina* Ell. & Evht.**

On *Rudbeckia laciniata*. Cornell. The translation of "abruptly bent" by "abrupte incurva" in the *Sylloge Fungorum* is somewhat misleading. Much longer conidia occur than the description indicates, one having a length of 250μ having been measured. The leaf tissue of an old spot becomes filled with moniliform mycelium, and what appear to be immature epiphyllous perithecia occur. A collection on *Prenanthes alba* from Mosinee I have also referred to this species. Collected also at Tomahawk on this host. The conidiophores are not always bent but are often undulate instead.

[A collection has since been made on *Rudbeckia hirta* at Caryville in which the development is less vigorous the conidiophores being largely scattered and nearly straight, $70-100 \times 4\mu$ and the conidia $25-45 \times 3-4\mu$ indistinctly septate or continuous.]

There was collected in small quantity on *Trifolium repens* at Madison in the spring of 1916 and of 1917 a rust that I have referred to *Uromyces flectens* Lagh.

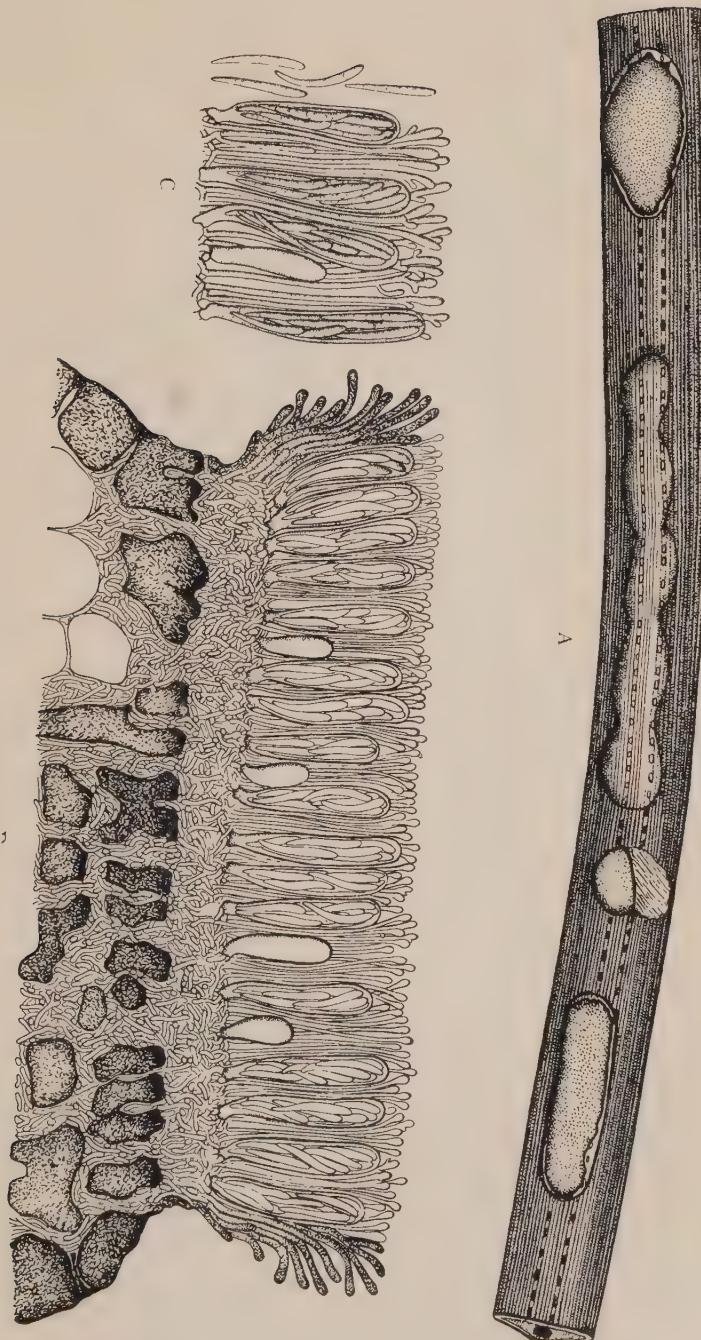
***Puccinia montanensis* Ell. & Evht.**

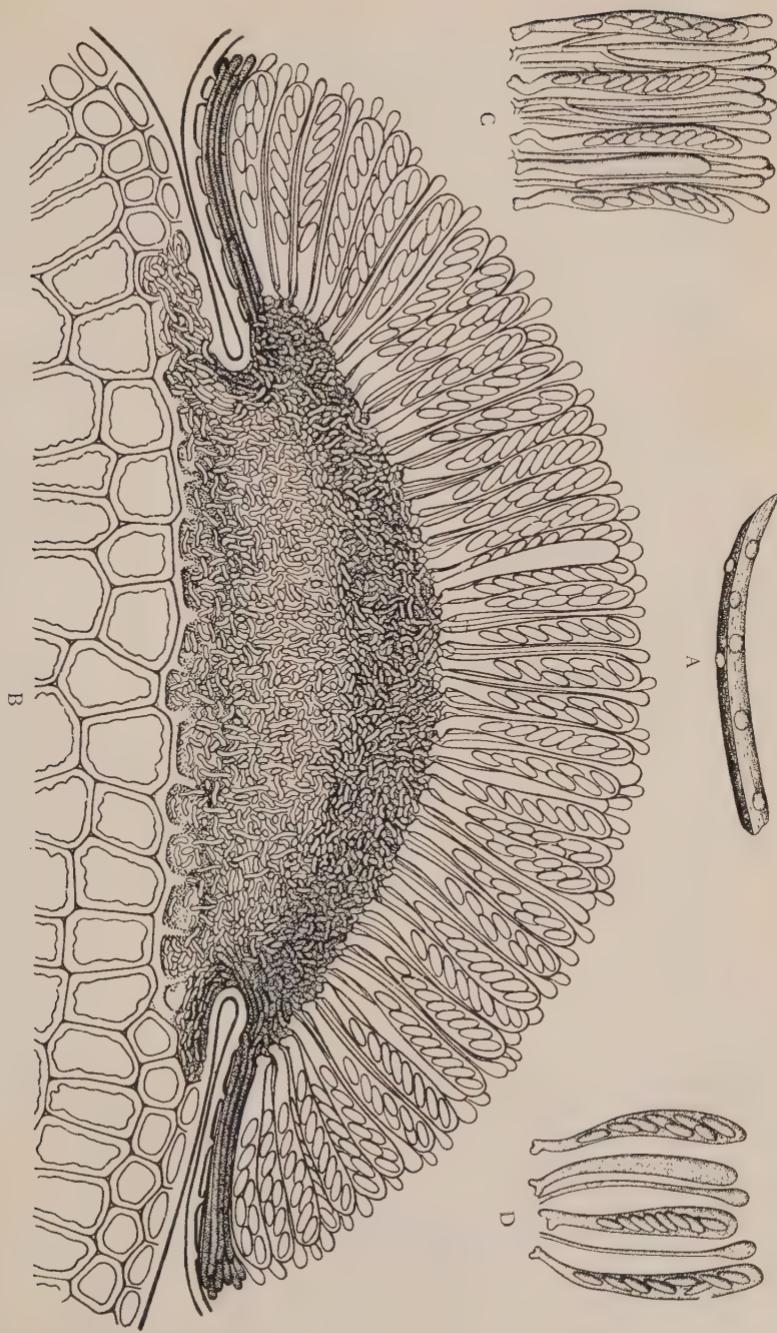
Telia on *Elymus canadensis*. Hancock. Determined by Arthur.

Kern has segregated *Puccinia canaliculata* (Schw.) Lagh. from *P. cyperi* Arth. (*Mycologia* 11: 136 et seq.) *Cyperus strigosus* and *C. Houghtonii* are hosts of *P. canaliculata* in Wisconsin. To this species Kern refers the Aecidium on *Xanthium* also.

***Puccinia cicutae* Lasch.**

Telia on *Cicuta maculata*. Bruce and Cornell.





Puccinia bardanae Cda.

Telia on *Arctium minus*. Madison. This was first collected in Wisconsin by Dr. H. S. Jackson in 1918. It rapidly spread throughout the city. [Aecia and uredinia have since been collected.]

Aecidium ingenuum Arth. (*Bull. Torrey Bot. Club* 46: 124).

On *Picea canadensis*. Fish Creek and Solon Springs. This is of the type referred to *Peridermium* in the provisional list. It appears to be rare.

HERBARIUM OF THE UNIVERSITY OF WISCONSIN,
MADISON, WISCONSIN, APRIL, 1920

DESCRIPTION OF PLATES

PLATE XXXI

A. Apothecia of *Phacidium planum* n. sp. on leaf of *Pinus Strobus*. Magnified 35 diameters. B. Vertical section of an apothecium of the same. C. Ascii, paraphyses, and, at the left, four free ascospores. Magnified about 350 diameters. Drawn with the aid of camera lucida by Charles Drechsler.

PLATE XXXII

A. Apothecia of *Phacidium expansum* n. sp. on leaf of *Picea mariana*. Magnified 4 diameters. B. Vertical section of an apothecium. C, D. Ascii and paraphyses of same magnified about 350 diameters. Drawn by Charles Drechsler with the aid of camera lucida.

INDEX

TO HOSTS AND PARASITES REFERRED TO IN
NOTES VII AND VIII.

The names of Fungi are in italic type.

Abies balsamea, 409
Acanthostigma occidentalis (E. & E.)
 Sacc., 423
Acer Negundo, 425
Aecidium euphorbiae Gmel., 402
Aecidium ingenuum Arth., 431
Aecidium iridis Ger., 402
Aecidium lysimachiae (Schl.) Wallr.,
 402
Aecidium magnatum Arth., 410
Aecidium maianthae, 410
Aecidium monoicum Pk., 417
Aecidium tithymali Arth., 402
Agropyron caninum, 423
Agropyron repens, 420, 421.
Agropyron tenerum, 406
Albugo candida (Pers.) Kuntze, 417
Alisma Plantago-aquatica, 420
Althaea rosea, 419.
Amelanchier canadensis, 406
Andropogon furcatus, 418
Arabis glabra, 417
Arabis hirsuta, 403
Arabis lyrata, 417
Aralia nudicaulis, 428
Arctium minus, 431
Artemisia serrata, 403, 410
Asclepias syriaca, 416
Ascochyta alismatis E. & E., 420
Ascochyta clematidina thalictri Davis,
 403, 418
Ascochyta lophanthi lycopina Davis,
 403
Ascochyta pisi Lib., 418
Aster multiflorus, 422
Aster puniceus, 404, 419
Aster Tradescantii, 419
Aster umbellatus, 428
Asteroma populi Rab. & Desm., 425
Baptisia bracteata, 403
Bidens vulgata, 417
Blephilia hirsuta, 406
Bromus altissimus, 404
Bromus inermis, 420

Caeoma (Uredo) teucrii Schw., 416
Calamagrostis canadensis, 404
Carex, 423, 426
Cercospora asclepiadis Ellis, 416
Cercospora asclepiadis Henn., 416
Cercospora callae Pk. & Cl., 400
Cercospora clavata (Ger.) Pk., 416
Cercospora comari Pk., 423
Cercospora convolvuli Tr. & Earle, 430
Cercospora flagellifera Atk., 429
Cercospora galii E. & Hol., 405
Cercospora gaultheriae E. & E., 429
Cercospora helianthi E. & E., 422
Cercospora leptosperma Pk., 401
Cercospora longispora Pk., 401
Cercospora medicaginis E. & E., 429
Cercospora muhlenbergiae Atk., 421
Cercospora osmorrhizae E. & E., 421
Cercospora ranunculi E. & Hol., 428
Cercospora rhamni Fckl., 416
Cercospora rosicola Pass., 405, 421
Cercospora rubigo Cke. & Hark., 428-9
Cercospora subsanguinea E. & E., 416
Cercospora tabacina E. & E., 430
Cercospora teucrii (Schw.) Arthur &
 Bisby, 416
Cercospora tortipes n. sp., 430
Cercospora tuberculella n. sp., 429
Cercospora varia, Pk., 422
Cercospora venturioides Pk., 416
Cercospora vexans C. Massal., 421
Cercospora violae Sacc., 421
Cercospora tinea Sacc., 422
Cercosporella dearnessii Sacc., 428
Cercosporella leptosperma (Pk.) Da-
 vis, 401
Chrysanthemum Leucanthemum, 409
Cicuta maculata, 430
Cinna latifolia, 406
Cirsium discolor, 423
Cladosporium aromaticum E. & E., 421
Cladosporium astericola n. sp., 428
Cladosporium nervale Ell. & Dearn.,
 421

Coccochora rubi Davis, 413
Coleosporium ribicola (C. & E.) Arth., 411
Coleosporium sonchi-arvensis (Pers.) Lev., 402
Coleosporium viburni Arth., 406
Colletotrichum magnusianum Bres., 427
Colletotrichum silphii Davis, 414
Colletotrichum solitarium Ell. & Barth., 419
Convallaria majalis, 422
Convolvulus sepium, 429
Convolvulus spithameus, 419
Coreopsis palmata, 409
Cronartium, 402
Cryptomyces pteridis (Reb.) Rehm, 414
Cylindrosporium artemisiae Dearn. & Barth., 410
Cylindrosporium bandysianum Sacc., 420
Cylindrosporium eminens Davis, 419
Cylindrosporium leptospermum Pk., 401
Cylindrosporium ribis Davis, 400
Cylindrosporium salicifoliae (Trel.) Davis, 427
Cylindrosporium spiraeicolum E. & E., 427
Cylindrosporium tradescantiae E. & K., 401
Cyperus Houghtonii, 430
Cyperus strigosus, 430
Dactylis glomerata, 418, 420
Desmodium paniculatum, 418
Didymaria aquatica, Starb., 420
Diervilla Lonicera, 416
Ellisiella mutica Wint., 414
Elymus canadensis, 421, 425, 430
Entyloma crastophilum Sacc., 422
Entyloma thalictri Schroet., 405
Eriphorum viridicarinatum, 423
Erysiphe cichoracearum DC., 403
Erysiphe graminis DC., 418
Euphorbia commutata, 402
Fagopyrum esculentum, 415
Fragaria vesca, 421
Fragaria virginiana, 421
Fraxinus pennsylvanica, 427
Fusicladium radiosum (Lib.) Lind., 401, 402
Galium asprellum, 405
Gaultheria procumbens, 429
Geranium Bicknellii, 423
Geum strictum, 403
Gloeosporium aridum E. & Hol., 427
Gloeosporium balsameae n. sp., 409
Gloeosporium bicolor n. sp., 427

Gloeosporium canadense E. & E., 414
Gloeosporium equiseti E. & E., 409
Gloeosporium fraxineum Pk., 427
Gloeosporium irregulare Pk., 427
Gloeosporium leptospermum Pk., 414
Gloeosporium ramosum E. & E., 427
Gloeosporium ribis (Lib.) D. & M., 419
Gloeosporium salicis West., 404
Gloeosporium thalictri Davis, 403
Glyceria pallida, 422
Gymnoconia peckiana (Howe) Trotter, 417
Gymnosporangium juvenescens Kern, 406
Helianthemum majus, 419
Helianthus occidentalis, 422
Helianthus strumosus, 422
Hordeum distichum, 420
Hordeum hexastichum, 420
Hordeum vulgare, 420
Humulus Lupulus, 399
Hydrocotyle americana, 408
Hypericum canadense, 406
Hypoderma brachysporum (Rostr.)
 Tub., 424
Impatiens, 406
Juniperus horizontalis, 406
Kalmia polifolia, 426
Kriegeria eriophori Bres., 410
Kuehneola albida (Kuehn) Magn., 417
Kuehneola uredinis (Lk.) Arth., 417
Laportea canadensis, 407
Lathyrus palustris, 422
Lathyrus venosus, 419
Ledum groenlandicum, 423
Leersia oryzoides, 404
Lespedeza capitata, 429
Lepidium apetalum, 403
Leptothyrium pomi (Mont. & Fr.)
 Sacc., 409
Lonicera canadensis, 426
Lophodermium thuyae n. sp., 424
Lycopus virginicus, 403
Marsonia secales Oud., 420
Marssonina kriegeriana (Bres.)
 Magn., 404
Marssonina nigricans (E. & E.)
 Magn., 404
Marssonina populi (Lib.) Magn., 404,
 414
Marssonina rubiginosa (E. & E.)
 Magn., 404
Medicago lupulina, 429
Melampsoropsis ledicola (Pk.) Arth., 423
Melica striata, 418
Microsphaera alni (Wallr.) Wint., 403

Microsphaera alni ludens Salm., 418
Muhlenbergia foliosa, 421
Mycosphaerella innumerella (Karst.), 423
Myriocionum comitatum Davis, 414
Oakesia sessilifolia, 418, 422
Onoclea Struthiopteris, 407
Osmorrhiza Claytoni, 421
Ovularia avicularis Pk., 414
Ovularia pulchella (Ces.) Sacc., 421
Ovularia rigidula De Lacr., 414
Panax quinquefolium, 409
Panicum miliaceum, 410
Peridermium, 431
Peronospora parasitica (Pers.) Fr., 403
Petasites palmatus, 417, 426
Phacidium balsameae n. sp., 424
Phacidium expansum n. sp., 424
Phacidium planum n. sp., 424
Phalaris arundinacea, 402
Phleospora oxyacanthae (K. & S.) Wallr., 401
Phleospora reticulata E. & E., 419
Phyllachora, 403, 404, 418
Phyllachora melicicola Speg., 418
Phyllosticta bacteriospora Vuill., 425
Phyllosticta cruenta (Fr.) Kx., 418
Phyllosticta platanoïdis Sacc., 425
Picea canadensis, 431
Piggotia vaccinii n. sp., 426
Pinus Strobus, 424
Piricularia grisea (Cke.) Sacc., 404
Piricularia parasitica E. & E., 421
Plasmopara humuli, M. & T., 399
Platygloea eriophori (Bres.) Hoehn., 410
Poa triflora, 423
Polygala paucifolia, 411
Polygala sanguinea, 427
Polygonatum, 410
Polygonatum biflorum, 422
Polygonatum commutatum, 422
Polygonum amphibium, 414
Polygonum aviculare, 414, 415
Polygonum ciliinode, 414, 415, 416
Polygonum convolvulus, 415
Polygonum Muhlenbergii, 414, 415
Polygonum Persicaria, 415
Polygonum scandens, 415
Populus balsamifera, 401, 402, 404, 414
Populus grandidenta, 401
Populus tremuloides, 401, 414, 425
Potentilla palustris, 423
Prenanthes alba, 430
Psedera, 413
Puccinia agropyri E. & E., 423
Puccinia bardanae Cda., 431
Puccinia canaliculata (Schw.) Lagh., 430
Puccinia cicutae Lasch, 430
Puccinia elymi-impatientis Davis, 406
Puccinia eriophori, Thuem., 423
Puccinia graminis Pers., 406
Puccinia impatientis Arth., 403
Puccinia impatienti-elymi Arth., 406
Puccinia limosae Magn., 402
Puccinia menthae Pers., 406
Puccinia montanensis E. & E., 430
Puccinia perminuta Arth., 406
Puccinia poarum Niels., 423
Puccinia polygalae Paschke, 411
Puccinia polygoni-amphibii Pers., 423
Puccinia pyrolae Cke., 411
Puccinia sessilis Schn., 402
Puccinia stipae Arth., 422
Pyrus Malus, 409
Quercus bicolor, 427
Ramularia alismatis Fautr., 419, 420-421
Ramularia anomala Pk., 415
Ramularia biflorae Magn., 416
Ramularia destructans Zinss., 409
Ramularia diervillae Pk., 416
Ramularia impatientis Pk., 421
Ramularia ionophila Davis, 416
Ramularia magnusiana (Sacc.) Lin-dau, 428
Ramularia minax n. sp., 409
Ramularia occidentalis E. & E., 415
Ramularia panacicola Zinss., 409
Ramularia racemosa E. & M., 416
Ramularia repens, E. & E., 428
Ramularia rosea (Fckl.) Sacc., 421
Ramularia rubicunda Bres., 416
Ramularia rufomaculans Pk., 414, 415
Ramularia sagittariae Bres., 421
Ramularia umbrina Davis, 416
Ramularia virgaureae Thuem., 421
Ranunculus rhomboideus, 408
Ranunculus septentrionalis, 428
Rhamnus alnifolia, 416
Rhamnus cathartica, 416
Rhus glabra, 421
Rus typhina, 421
Rhynchosporium alismatis (Oud.) n. comb., 420
Rhynchosporium graminicola Heinsen, 420
Rhynchosporium secales (Oud.) n. comb., 420
Ribes, 400
Ribes americanum, 405
Ribes cynosbati, 402, 411, 419
Ribes gracile, 419
Ribes oxyacanthoides, 419

Ribes prostratum, 405
Rosa, 423
Rosa blanda, 405
Rosa humilis, 421
Rubus, 413
Rubus canadensis, 413
Rubus hispida, 417
Rubus idaeus aculeatissimus, 417
Rudbeckia hirta, 430
Rudbeckia laciniata, 417, 430
Rumex britannica, 415
Sacodium ulmi-gallae K. & S., 404
Sagittaria heterophylla, 419, 420
Salix cordata, 404
Salix discolor, 404
Salix glaucocephala, 421
Salix longifolia, 404
Salix petiolaris, 404
Salix syrticola, 404
Scirpus atrovirens, 410
Sclerotium deciduum Davis, 407
Secale cereale, 420
Septogloewum ampelopsis (E. & E.) Sacc., 413
Septogloewum dimorphum Sacc., 410
Septoria acerina Pk., 413
Septoria alismatis Oud., 420
Septoria ampelopsis Ellis, 413
Septoria angustifolia E. & E., 426
Septoria atropurpurea Pk., 404, 419
Septoria bromi Sacc., 404
Septoria chrysanthemi Allesch., 409
Septoria convolvuli Desm., 419
Septoria coreopsis n. sp., 408
Septoria fairmani E. & E., 419
Septoria fusispora Died., 399
Septoria glumarum Pass., 399
Septoria graminum Desm., 404
Septoria hyalina E. & E., 400
Septoria hydrocotyles Desm., 408
Septoria intermedia E. & E., 400
Septoria malvicola E. & M., 419
Septoria polaris Karst., 408
Septoria rubi West., 413
Septoria salicifoliae (Trel.), 427
Septoria sibirica Thuem., 400, 405
Septoria solidaginicolae Pk., 400
Septoria tradescantiae (E. & E.) n. comb., 401
Septoria verbena R. & D., 404
Septoria violae West., 400
Septoria xylostei Sacc. & Wint., 426
Septoriopsis leptosperma (Pk.) n. comb., 401
Septoriopsis longispora (Pk.) n. comb., 401
Setaria italicica, 404
Smilacina racemosa, 410, 422
Smilacina stellata, 410, 422
Smilax hispida, 399
Solidago altissima, 428
Solidago nemoralis, 419
Solidago rigida, 409
Solidago serotina, 421
Solidago speciosa, 419, 421
Sonchus asper, 402
Spartina Michauxiana, 410, 422
Sphacelotheca cruenta (Kuehn) Potter, 402
Sphacelotheca sorghi (Lk.) Clint, 402
Sphaerotheca humuli fuliginea (Schl.) Salm., 417
Sphaerotheca pannosa (Wallr.) Lev., 423
Sphaerulina pallens n. sp., 423
Spiraea densiflora, 428
Spiraea salicifolia, 428-9
Spiraea tomentosa, 427
Spirodela polyrhiza, 402
Sporobolus cryptandrus, 403
Stagonospora arenaria Sacc., 425
Stagonospora petasitidis E. & E., 426
Stagonospora smilacis (E. & M.) Sacc., 399
Stagonospora tetramera n. sp., 426
Stipa spartea, 422
Synchytrium aureum Schroet., 403, 417
Synchytrium cellulare Davis, 413
Synchytrium pulvareum n. sp., 407
Taphrina ulmi (Fckl.) Johans., 408
Thalictrum dasycarpum, 403, 418
Thalictrum dioicum, 403
Thalictrum revolutum, 405
Thuya occidentalis, 424
Tilia americana, 425
Tracya lemnae (Setch.) Syd., 402
Trientalis americana, 428
Trifolium hybridum, 411
Trifolium repens, 430
Triticum vulgare, 399
Ulmus americana, 404
Uromyces acuminatus Arth., 410, 422
Uromyces fabae (Pers.) DBy., 422
Uromyces flectens, Lagh., 430
Uromyces hybidi W. H. Davis, 411
Uromyces hyperici-frondosi (Schw.) Arth., 406
Uromyces magnatus Arth., 410
Ustilago panic-miliacei (Pers.) Wint., 410
Uvularia grandiflora, 422
Vaccinium canadense, 427
Venturia compacta Pk., 408
Verbena bracteosa, 404

431e *Wisconsin Academy of Sciences, Arts, and Letters.*

Vermicularia silphii Schw., 414
Veronica scutellata, 430
Viburnum pubescens, 406, 422
Vicia americana, 418, 419
Vicia caroliniana, 418, 422

Viola, 399
Viola canadensis, 416
Viola conspersa, 421
Viola ocellata, 416

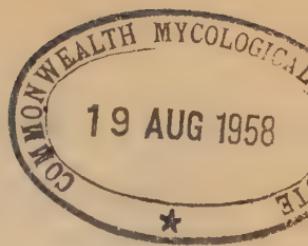
NOTES ON PARASITIC FUNGI IN WISCONSIN

IX—X—XI

BY J. J. DAVIS

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XXI.

Issued July, 1924



NOTES ON PARASITIC FUNGI IN WISCONSIN—IX

J. J. DAVIS

The greater part of the field work in 1920 was done along the lower Wisconsin and the Mississippi river, the Chippewa and its tributaries, the Yellow, the Fisher, and the Jump rivers. The season was an unfavorable one because of low precipitation, which however allowed an unusual proportion of working days.

Plasmopara acalyphae Wilson previously known only from the type station at Madison was found in July 1920 at Caryville in the Chippewa valley. As usual the development of conidiophores was scanty. [Collected since at Lone Rock, Arena and Oconto but always scanty.]

Plasmopara obducens Schroet. in summer is sometimes confined to small angular leaf areas which become brown, thus causing spotting of the affected leaves. The summer development of this mildew is more common northward.

What is presumed to be mycelium and conidia of *Sphaerotheca humuli* (DC.) Burr. is sometimes abundant on leaves of *Rubus allegheniensis* at Madison during the early part of the season, disappearing in summer without development of perithecia. It has been noticed that the thickened leaves of the plants bearing Caeoma are especially liable to this infection.

In a collection on twigs and young leaves of *Physocarpus opulifolius* from Fish Creek referred to *Sphaerotheca humuli* (DC.) Burr. the perithecia bear long tapering appendages like those of *Podosphaera leucotricha* (E. & E.) Salmon in addition to short rhizoid basal ones. These long appendages are not apical, however, but basal or equatorial, and the spores are not crowded in the ascus. Nevertheless the *Sphaerotheca* would appear to be the "next of kin" to the apple mildew. The mildew on *Physocarpus* appears to over winter in the twigs or buds.

Phyllachora oryzopsisidis Theiss. & Syd. has been collected on *Oryzopsis asperifolia* at Mosinee. The collection was made in

September and the spores are smaller than indicated in the description.

For the parasite recorded in "Notes" V, p. 696, under the name *Lophodermium lineare* Pk. (*Rhytisma lineare* Pk., *Hypoderma lineare* Pk.) von Hoehnel has proposed a new genus, *Bifusella* (*Ann. Mycol.* 15:318-19.)

In "Notes" IV pp. 683-4 reference was made to a group of variable Sphaerioidaceae on *Atriplex* and *Chenopodium* members of which have been referred to *Phyllosticta*, *Ascochyta*, *Diplodina*, *Septogloeum*, *Stagonospora*, *Phleospora* and *Septoria* and to the reference of the group as a whole to *Stagonospora atriplicis* West. by Lind and to *Septoria chenopodii* West. by Grove. In a discussion of some members of this group by J. B. Ellis the conclusion was reached that "This variability would seem to strengthen the supposition that all the forms here enumerated may be referred to *Septoria (Phyllosticta) atriplicis* Desm." (*Journ. Mycol.* 4:117-18 [1888].) A parasite collected on *Chenopodium album* at Caryville July 21, 1921, appears to be an extreme variant of this group because of the long and slender sporules. The following notes were made: Spots suborbicular, immarginate, light yellow to yellowish green, averaging about $\frac{1}{2}$ cm. in diameter; pycnidia amphigenous, scattered evenly over the spots; sporules discharged in colorless cirri, hyaline, straight or curved, 1-3 septate, $24-67 \times 2\frac{1}{2}-3\frac{1}{2}\mu$. The sporules often appear continuous in a water mount. Apparently they are catenulate, their length depending upon the number of abstrictions of the primary sporule.

In a collection of *Septoria aquileiae* Penz. & Sacc. from Durand (July 12, 1920) the sporules are mostly about twice the typical length but without noticeable increase in diameter.

Septoria ampelopsisidis Ellis appears to be a better developed state of the parasite recorded in the provisional list under the name *Septogloeum ampelopsisidis* (E. & E.) Sacc. This form with definite pycnidia and long and slender sporules has been collected on *Psedera* at Madison, Wausau and Durand. I have labeled it *Septoria ampelopsisidis* (E. & E.) Ellis.

In a collection of *Septoria* on *Cicuta maculata* made at Weyerhaeuser, September 9, 1918, the pycnidia are borne on small (1 mm. or less) subcircular white arid spots having a dark reddish brown border; the globose pycnidia are $80-85\mu$ in diameter, the sporules

30–45x1–1½ μ . It was labeled provisionally *Septoria umbellifera-rum* Kalchb.

In "Notes" V it was stated that while in *Gloeosporium caryae* Ell. & Dearn. as found on *Carya ovata* the acervuli are hypophylloous in the collections on *C. cordiformis* they are epiphyllous. In a collection on the latter host made at Caryville in 1920 they are amphigenous.

In a collection of *Marssonina fraxini* Ell. & Davis from the Mississippi river bottoms at Glen Haven the sporules range from 30–50x2½–4 μ . No matter what the length of the sporule but a single septum appears.

R. E. Stone states that the ascogenous state of *Marssonina poten-tillae* (Desm.) Magn. is *Mollisia earliana* (E. & E.) Sacc.

In the parasite recorded as *Cylindrosporium clematidis* in the provisional list the sporuligerous stroma, under favorable conditions, forms a hollow sphere and the spore body is therefore a pyrenidium.

In "Notes" IV, p. 687 *Septocylindrium caricinum* Sacc. was recorded as occurring in Wisconsin. Examination of the specimen on *Carex grisea* from Blue Mounds however reveals only tufts of hyphae indistinguishable from the conidiophores of *Cercospora caricina* Ell. & Dearn. which are sometimes nearly or quite hyaline. The *Septocylindrium* record therefore should be stricken out.

Cercosporella apocyni E. & K. and *Cylindrosporium apocyni* E. & E. sometimes occur on the same spots. May it be that they are conidial forms of one species?

Specimens of the parasite on *Populus tremuloides* referred to *Cladosporium subsessile* Ell. & Barth. have been collected in which the tufts are scattered over unaltered portions of the leaves.

W. B. Tisdale has shown the connection between *Heterosporium gracile* Sacc. and the ascigerous stage *Didymellina iridis* (Desm.) Hoehn. (*Phytopathology* 10:153–4.)

Cercospora arctostaphyli Davis (*Trans. Wis. Acad.* 18:268) seems to have been founded upon a misapprehension. There is no specimen in the University of Wisconsin herbarium and the characters ascribed are those of *Cercospora gaultheriae* E. & E. It should be stricken out.

In "Notes" V p. 694 reference was made to a small collection on *Ambrosia trifida* from Maiden Rock which was referred to *Entyloma polysporum* (Pk.) Farl. This form with definite, orbicular, yellow, thickened, concavo-convex spots is however merely a late stage of *E. compositarum* Farl. although it differs strikingly in appearance from the earlier conidiophorous state. The spore walls do not become thick. Field observation is said to indicate that *Entyloma calendulae* (Oud.) D By. as it occurs in Europe is composed of races adapted to various genera of Compositae and H. & P. Sydow have proposed eight binomials for the designation of these races (*Ann. Mycol.* 16:244). The same kind of evidence indicates that an equal number of races of *Entyloma compositarum* Farl. exist in Wisconsin but I see nothing to be gained by using binomials for them as it would tend to obscure their very close kinship. It would require a large amount of experimentation to demonstrate that under no circumstances is there passage from one host genus to another. There seems to be a very close adaptation of parasite to host in the Ustilaginales in general and with that in mind the citation of the host gives the information in this case that would be conveyed by a binomial without obscuring the conception of phylogenetic unity. It seems quite possible that no violence would be done in considering *E. calendulae* (Oud.) D By. and *E. compositarum* Farl. as two geographical series of races of a single species.

In Notes II p. 106 it was stated that *Uromyces graminicola* Burr. had been collected at Madison on the railroad right of way. It was not again observed until 1920 when it was found at Durand in the western part of the state.

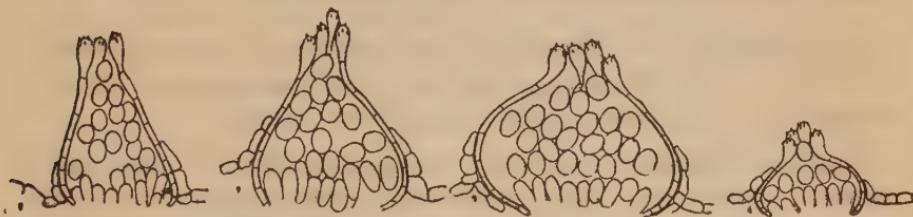
For the rust on *Koeleria cristata* having its aecial stage on *Liatris* I am using the designation *Puccinia koeleriae-liatridis* instead of *P. liatridis* Bethel. *P. koeleriae* Arth. with aecia on *Berberis* is considered to be distinct.

Puccinia pustulata (Curt.) Arth. with aecia on *Comandra* is treated as a race of *P. andropogonis* Schw. in *North American Flora*.

Puccinia simillima Arth. is united with *P. magnusiana* Koern. in *North American Flora*.

In the provisional list *Rubus idaeus aculeatissimus*, *R. occidentalis* and *R. triflorus* were given as hosts of *Pucciniastrum arcticum*

americanum Farl. The collections on *Rubus triflorus* however should be referred to the type while I find no specimens in the herbarium which I can determine as being on *R. occidentalis*. A specimen on this host collected by B. O. Dodge in Wisconsin at Algoma was reported by Arthur as *P. arcticum* but Dr. Arthur informs me that this was an error and that the specimen is of the *americanum* type which is not rare in Wisconsin on the red raspberry and that the host is *R. strigosus*. Arthur has proposed the raising of the variety *americanum* Farl. to specific rank (*Bull. Torr. Bot. Club* 47: 468) but certain forms on *Rubus idaeus aculeatissimus* having globose peridia seem closely allied to the type.



FIGS. 1-3. Sections through uredio sori of *Pucciniastrum* on *Rubus idaeus aculeatissimus*.

FIG. 4. Section through a uredio sorus of *Pucciniastrum* on *Rubus triflorus*.

Drawn by E. M. Gilbert with the aid of camera lucida. Fig. 4 was drawn from a small sorus and the disparity in size is somewhat exaggerated.

For the *Abies-Salix* rust recorded in "Notes" II & III under the binomial *Melampsora arctica* Rostr. Arthur proposes *M. americana* (*Bull. Torr. Bot. Club* 47:465-68.) Besides the localities which he gives the Caeoma has been collected in Wisconsin at Mountain and at Kelly lake in Oconto county and at Solon Springs. All of the localities are in either the northeastern or the northwestern corner of the state. Various collections of uredinia and telia on species of *Salix* have been referred to this species with doubt as they do not seem to be readily separable by their morphological characters from those of *Melampsora bigelowii* Thuem.

ADDITIONAL HOSTS

Not previously recorded as bearing the parasites mentioned in Wisconsin.

Synchytrium aureum Schroet. On *Hydrocotyle americana* Caryville. Many leaves bore the parasite at this restricted station but the sori were much scattered; only one or very few on a leaf.

Peronospora leptosperma DBy. was collected at Jump River on a host that was referred to *Artemisia serrata*.

Peronospora rubi Rabh. was found in June, 1920, at Blue Mounds on *Rubus allegheniensis* growing along the railroad. The mildew was apparently confined to plants parasitized by Caeoma.

Bremia lactucae Regel. On *Lactuca Scariola integrata*, Madison.

Basidiophora entospora Roze & Cornu. On *Aster Tradescanti*. Madison. Rather abundant on this host in the autumn of 1920.

Gnomonia ulmea (Schw.) Thuem. Immature material was collected on *Ulmus racemosa* at Nekoosa in September.

In September, 1919, Phyllachora on *Melica striata* was collected at Mosinee. The material is immature but the characters of the ascomata are not those of *Phyllachora melicae* Speg.

Phyllosticta phomiformis Sacc. On *Quercus bicolor*. La Crosse. Globose, dark brown, opaque cells $7-10\mu$ diameter are also found in this collection.

Phyllosticta grossulariae Sacc. On *Ribes oxyacanthoides*. Durand. Sporules smoky tinted.

Septoria noctiflorae Ell. & Kell. On leaves and calyes of *Silene nivea*. Durand. In the collection referred to this species the sporules are $30-45 \times 1\frac{1}{2}-2\frac{1}{2}\mu$, continuous, but the material is not mature.

Septoria gei Rob. & Desm. On *Geum canadense*. Glen Haven. The pycnidia are imperfect in these specimens.

Septoria scrophulariae Pk. On *Scrophularia leporella*. Glen Haven.

Septoria stachydis Rob. & Desm. On *Stachys palustris*. Coon Valley.

Septoria commonsii Ell. & Evht. On *Cirsium discolor*. Durand.

Phleospora ulmi (Fr.) Wallr. On *Ulmus fulva*. Fountain City.

In "Notes" VII mention was made of the fact that *Gloeosporium salicis* West. had been found in Wisconsin on foreign species of *Salix* only. In 1919 a tree of *Salix alba vitellina* bearing the *Gloeospo-*

sporium was observed at Fish Creek and under it a shrub of *Salix lucida* also bearing the *Gloeosporium*.

Gloeosporium fraxineum Pk. On *Fraxinus pennsylvanica*. Mosinee.

Gloeosporium aridum Ell. & Hol. On *Fraxinus nigra*. Caryville.

Colletotrichum graminicolum (Ces.) Wilson. On *Melica striata*. Mosinee. A *Colletotrichum* which was abundant on leaves of *Carex eburnea* at Fish Creek I do not distinguish from this species.

Marssonina rhabdospora (E. & E.) Magn. On *Populus tremuloides*. Millston, Cornell and Holcombe. My observation of this parasite does not lead me to look with favor on the suggestion of von Hoehnel that it is a form of *Septoria populi* Desm.

The parasite recorded under the name *Marssonina potentillae tormentillae* Trail in "Notes" III p. 259 was collected on *Rubus canadensis* at Tomahawk but immature or imperfectly developed as usual. Collections of a similar character were made on a host referred to *Rubus hispida* at Millston in 1912.

Cylindrosporium vermiforme Davis. On *Alnus crispa*. Minocqua. In the collection on this host, which was made in August, the sporules are slender, being but about 3μ thick.

Ramularia lysimachiae Thuem. On *Lysimachia terrestris*. Vilas County and Holcombe. Conidiophores up to 40μ long.

Ramularia virginiae Thuem. On *Solidago nemoralis*. Caryville.

Ramularia asteris (Phil. & Plowr.) Bubak. On *Aster lateriflorus*. Nekoosa. *Aster Tradescanti*. Caryville and Madison.

Cercospora pyrina Ell. & Evht. On *Pyrus ioensis*. Nekoosa.

A specimen on *Erigeron annuus* collected at Madison in September and referred to *Cercospora cana* Sacc. bears conidiophores $50-100 \times 3-6\mu$.

Cladosporium subsessile Ell. & Barth. On *Populus grandidentata*. Muscoda.

Cladosporium triostei Pk. On *Triosteum aurantiacum*. Glen Haven. In the material that I have seen the patches of conidio-

phores may precede the spotting, the conidia are devoid of apical papillae and the narrow base is truncate.

Cercospora caricina Ell. & Dearn. On culms, leaves and bracts of *Cyperus Schweinitzii*. Caryville.

Cercospora oxybaphi Ell. & Hals. On *Oxybaphus hirsutus*. Meridean.

Cercospora velutina Ell. & Kell. On leaves and stipules of *Baptisia bracteata*. Caryville.

The Cercospora that was tentatively referred to *C. flagellifera* Atk. in "Notes" VIII has been collected at Glen Haven on what was taken to be *Lespedeza frutescens*.

Cercospora viciae Ell. & Hol. On *Lathyrus palustris*. Caryville.

From the examination of a collection on *Solidago serotina* made at Durand August 18, 1920, the following notes were made: Spots angular, blackish brown becoming alutaceous and finally white and arid especially above, 1-2 mm. in diameter; conidiophores hypophyllous, single, in pairs or in small fascicles, erect, simple, terete and continuous or torulose and septate, fuligenous, $33-147 \times 4-6 \mu$; conidia obclavate, straight or but little curved, subhyaline, $67-200 \times 4-6 \mu$. Although the spots are smaller and more definite and the conidiophores and conidia of a fuligenous cast rather than brown I have referred this provisionally to *Cercospora stomatica* Ell. & Davis as perhaps a modified form on a different species of host.

Of a collection on the same species of host made at La Crosse August 24, 1920, it was noted that the spots are definite, angular, brown, mostly 1-2mm. in diameter; the conidiophores having more or less of a fuligenous coloration, $33-63 \times 4-6 \mu$, the conidia hyaline, upwardly attenuate, up to 110μ or more in length by $3-4 \mu$ thick. I was at first inclined to consider this to be a form of *Ramularia virgaureae* Thuem. modified by the dry weather but it can hardly be distinct from the collection referred to above.

On some of the leaves of the Durand material are small hypophyllous patches of *Ramularia* having straight, hyaline, subulate

conidiophores, 15–25x2 μ and catenulate, hyaline conidia which are straight, cylindrical with acute ends, 10–30x1 $\frac{1}{2}$ –2 μ . I have labeled this *Ramularia virgaureae* Thuem. Macroscopically the frost like patches look like those of *Cercosporaella*.

Schizonella melanogramma (DC.) Schroet. On *Carex longirostris*. Madison. (J. R. Heddle.)

Entyloma compositarum Farl. On *Ambrosia psilostachya*. Tomahawk. This host was given in Trelease's Preliminary List and should have been included in the provisional list.

Of a Uredo collected at Cadott, July 23, 1920, on *Carex intumescens* Dr. Arthur reports, "appears to me to belong to *Uromyces minutus* Diet. rather than to *Puccinia minutissima*. I judge this from the fact that the pores are almost entirely equatorial and also because the host is more closely of the character of the *Uromyces* hosts than of the *Puccinia* forms. It is just possible that these two rusts are correlated but as to that we have made insufficient study to say with certainty."

Uromyces hedsari-paniculati (Schw.) Farl. Uredinia and telia on *Desmodium canadense*. Westby.

A single spot of *Aecidium fraxini* Schw. (*Puccinia peridermiospora* (E. & T.) Arth.) on a leaf of *Fraxinus nigra* was collected at Caryville.

Puccinia graminis Pers. Telia on *Agropyron tenerum*. Mosinee.

In "Notes" II *Puccinia gigantispora* Bubak was recorded from Glen Haven on a host that was not determined as between *Anemone virginiana* and *A. cylindrica*. A collection of aecia and telia from the same locality made in 1920 is on *A. virginiana*.

Dr. Arthur is of the opinion that the aecia and telia in these collections are not genetically related but are aecia of *Puccinia agropyri* E. & E. and telia of *Puccinia anemones-virginianae* Schw.

Puccinia absinthii DC. Uredinia on *Artemisia ludoviciana*. Prairie du Chien and Caryville.

Sclerotium deciduum Davis occurred at Caryville in 1920 on *Aster paniculatus* or an allied species.

ADDITIONAL SPECIES

Not previously recorded as occurring in Wisconsin.

Plasmopara cubensis (B. & C.) Humphrey. On *Cucumis sativa* (cult.). Madison. The first collection of this parasite in Wisconsin, to my knowledge, was made in 1920. It is hoped that it was merely casual.

Eocronartium muscicola (Fr.) Fitzp. (*Typhula muscicola* (Pers.) Fr.) has been collected a number of times in Wisconsin on unidentified mosses. Most of the collections were made by Cheney in the northern part of the state.

Cordyceps clavulata (Schw.) Ell. & Evht. On scale insects (Lecanium) on *Fraxinus nigra* and *Ilex verticillata*. Hannibal. Very abundant on the black ash in 1920; seen on but two plants of *Ilex*. Immature specimens on *Lecanium corni* collected by J. G. Sanders in 1913 are probably of this species. Apparently parasitic on and destructive to the Lecanium.

Phyllosticta phaseolina Sacc. On *Strophostyles helvola*. Cassville. The flattened pycnidia with dark and much thickened upper wall and pale basal wall have a leptostromatoid appearance.

Phyllosticta fraxinicola Curr. On *Fraxinus pennsylvanica*. Durand. Spots along the midvein, angular, pale margined; sporules $3-6 \times 2\frac{1}{2}-3\mu$, smoky hyaline.

On looking over a collection of *Cercospora dioscoreae* E. & M. one of the leaves was found to bear *Phyllosticta dioscoreae* Cke. Many of the sporules are two celled.

Marssonina thomasiiana (Sacc.) Magn. On *Evonymus atropurpureus*. Glen Haven. In the Wisconsin collection the leaves are largely unspotted but pale spots appear late and red bordered ones are numerous. The subcuticular acervuli are mostly epiphyllous, quite variable in size and soon naked. The sporules are $17-23 \times 7-14\mu$, the lower cell narrower. In the description of the variety or "subspecies" *fautreyana* the width of the sporules is given as 4μ , but in Vestergrens *Micromycetes rariores selecti* 1240, said to have been submitted to Saccardo, it approximates that of the sporules in the Wisconsin collection.

A parasite that is probably conspecific with *Septogloewum convolvuli* Ell. & Evht. was collected on *Convolvulus spithameus* at Tomahawk August 22, 1919. The small, circular, pale brown spots are clustered on dead or dying leaf areas. The hyaline, straight, cylindrical sporules are $24-36 \times 3-3\frac{1}{2}\mu$ becoming triseptate.

Ramularia tenuis n. sp.

Spots yellowish, becoming black with age, subcircular to angular, immarginate, 2-10mm. in diameter; conidiophores epiphyllous, densely fasciculate from a prominent stromatoid base, hyaline, subulate to cylindrical, simple, continuous, usually straight, apex sometimes oblique, $10-20 \times 2-3\frac{1}{2}\mu$, conidia hyaline, cantenulate, usually straight, fusoid to cylindrical, acute, continuous to triseptate, $7-37 \times 1-3\mu$. On leaves of *Solidago latifolia*. Holcombe, Wisconsin. August 9, 1920. This may prove to be a form of *Cercosprella reticulata* Pk.

Botrytis epichloes Ell. & Dearn. On *Epichloe typhina* growing on *Glyceria nervata*. Hannibal.

Fusicladium effusum Wint. On *Carya cordiformis* at Muscoda on both sides of the Wisconsin river.

In these collections are spots 2-4mm. in diameter which are light brown above but much darker and less regular in outline below and also dark dead areas following the veins as well as indefinite marginal areas; the conidiophores are hypophyllous, septate, usually curved or undulate, $40-140 \times 3\mu$ in places swollen to 5μ thick; the conidia are obovate to fusoid or amygdaliform, subtruncate at base, continuous, $13-23 \times 6-7\mu$. The host tissue affected becomes friable. *Fusicladium caryigenum* Ell. & Langlois is perhaps the same parasite.

Fusicladium cerasi (Rabh.) Sacc. (*Cladosporium carpophilum* Thuem.) On fruit of *Prunus americana*. Caryville and Durand. This was abundant on wild plums in August, 1920. *Venturia cerasi* Aderh. is said to be the ascigerous stage (*Ann. Mycol.* 16: 81). Dr. G. W. Keitt informs me that the conidial form has been observed on cherries and also on leaves in Door county.

Cercospora moricola Cke. On *Morus rubra*. Millville. Conidia $40-75 \times 3-3\frac{1}{2}\mu$, becoming 3-6 septate; spots immarginate, indefinite below.

Cercospora euonymi Ellis. On *Evonymus atropurpureus*. Durand.

In this collection the conidiophores are hyaline, $35-50 \times 3 \mu$ the hyaline conidia cylindrical to obclavate-cylindrical, $30-50 \times 3-4 \frac{1}{2} \mu$. Despite the Mucedinous character and the smaller conidiophores and conidia it is unquestionably the parasite described under this name by Ellis and issued in *Fungi Columbiani*, 2211. The white spots with the broad dark purple border are conspicuous.

Cercospora teucrii Ell. & Kell. On *Teucrium canadense*. Caryville.

Ustilago hypodytes (Schlecht.) Fr. On *Stipa spartea*. Meridian.

Entyloma linariae Schroet. var., *gratiolae* n. var. Causing spots which are orbicular, yellowish white, 1mm. or less in diameter or larger and indefinite; spores broadly elliptical to globose with episporae varying from nearly smooth to verrucose, $13-18 \mu$ long. In leaves of *Gratiola virginiana*. Cadott, Wisconsin, July 22, 1920. The episporae in *Entyloma linariae* Schroet. is variously described by authors as being smooth, irregularly angularly thickened or as having a wavy outline because of low projections. In the collection referred to here some of the spores are studded with pale verrucosities which are perhaps the remains of the gelatinized hyphae. The form on this host is probably physiologically distinct from the var. *veronicae* Wint. (*E. veronicae* Lagh.) as well as from the type.

HERBARIUM OF THE UNIVERSITY OF WISCONSIN, MARCH, 1921

NOTES ON DISTRIBUTION AND ABUNDANCE

It is purposed to supplement the list of parasitic fungi occurring in Wisconsin with some notes on the distribution and frequency of the species in the state based upon the specimens preserved in the Davis and the University of Wisconsin herbaria and field observation. In attempting this one meets the fact that infection is dependent on variables and hence a parasitic flora is far from uniform. This seems to be especially true of those forms which infect by means of zoospores.

Synchytrium cellulare Davis. Where first found, at Devils Lake, (1913) the station, the bottom of a kettle hole, was very

restricted and the parasite disappeared therefrom in 3 or 4 years. It was not seen again until found at Babcock (1919) again very restricted in a low spot in the river bottoms. In 1920 it was found at Caryville, this time in more abundance, in an oxbow of Coon creek where it flows through the bottom lands along the Chippewa river and again in small quantity at Durand on the bank of the Eau Galle river near its mouth. From the situations in which this parasite has been observed it would appear that infection of the host is favored if the water in which the zoospores develop is impounded, thus preventing the carrying away of the infecting agents.

Synchytrium scirpi Davis. The collections of this form have been made only in the vicinity of Racine. It was first observed in 1904 southwest of the city and later northwest also, and appeared in the same places in successive years. It has been found upon the single species of host *Scirpus atrovirens*. It is possible that it is a form of the following species.

Synchytrium aureum Schroet. To this species are referred collections on a considerable number of hosts of widely different affinities and additions are made to the list yearly. When young and especially on succulent hosts the sori, as seen through a hand lens, are golden yellow, the color due apparently to the content of yellow oil. When older this disappears and the sori, in section are whitish. I have not seen an authentic specimen of *Synchytrium globosum* Schroet. but judging from the description some of the Wisconsin collections could be placed in that species. My observations lead me to suspect, however, that they represent a single species in different stages and on hosts of different character. The distribution is quite general as is indicated by the following list of collections:

Clintonia borealis, Athelstane, July 24, 1915.

Geum virginianum, Berryville, July 3, 7 and 14, 1892; August 30, 1892; June 10, 1894; October 9, 1894. Some of these are labelled "*Geum album*," (*G. canadense*.)

Geum strictum, Two Rivers, July 17, 1918.

Rubus triflorus, Turtle Lake, September 3, 1914; Solon Springs, August 6 and 14, 1915; Two Rivers, July 17, 1918; Bruce, September 4, 1918; Mosinee, September 1, 1919.

Rubus hispida, Millston, August 26, 27, 28, 1912; August 17, 19, 1915; July 21, 22, 1916; Athelstane, August 26, 1913; Wild Rose, July 9, 1918.

Rubus villosus (?), Millston, September 26, 1912.

Viola pallens, Solon Springs, June 17 and 23, 1914; Athelstane, July 27, 1915.

Viola pubescens, Barryville, July 3 and 9, 1892; Somers, June 22, 1902; Wild Rose, July 3, 1918.

Viola conspersa, Solon Springs, August 14, 1915.

Viola sp. indet., Solon Springs, August 7, 1915.

Hydrocotyle americana, Caryville, August 16, 1920.

Lysimachia terrestris, Millston, September 26 and 27, 1912.

Halenia deflexa, Solon Springs, August 7, 1915.

Lycopus uniflorus, Millston, September 26, 1912; Babcock, September 11, 1919.

Pedicularis canadensis, Racine, June 29, 1907.

Rudbeckia laciniata, Bruce, September 6 and 7, 1918.

Petasites palmatus, Prentice, August 18 and 19, 1918.

Prenanthes alba, Kenosha, July 4, 1907.

Synchytrium asari Arth. & Hol. This maintained itself from 1897 to 1902 at a station in southeastern Wisconsin. In 1908 it was observed in small quantity near Mellen in the northwestern part of the state. I have not seen it since.

Synchytrium pulvereum Davis. Found only in Rusk county in the north central part of the state. It was abundant at one station subject to overflow from a creek. [This has since been collected at White Lake and Sauk City.]

Synchytrium anemones (DC.) Wor. In Wisconsin, as elsewhere, this well marked species is of wide distribution and varying abundance. As is apt to be the case with common species it is not as well represented in the herbaria as are some that occur less frequently.

Synchytrium decipiens Farl. is the most frequent, abundant, and conspicuous species of the group. By some mycologists only

the first of these species is referred to *Synchytrium*, the last one to *Woroninella* and all of the others to *Pyrenopeltis*. If one may borrow from the usage in the rusts and represent repeating spores by II and resting spores by III they could be presented thus:

II, III *Synchytrium*.

III *Pyrenopeltis*

II *Woroninella*

Physoderma menyanthis (DBy). Collected but once (1902) near Found lake in the northern part of the state. But little was seen.

Physoderma vagans Schroet. But a single scanty collection has been made of this. It was found on bottom lands of the Wolf river. [Collected since at Spring Green.]

Cladodchytrium maculare (Wallr.) has been collected only in the southern portion of the state (Kenosha, Racine, and Dane counties) where it is not frequent but sometimes rather abundant and able to maintain itself in one station for several successive years.

Urophlyctis major Schroet. Observed only in the northeastern part of the state in Kewaunee, Oconto and Marinette counties. It is infrequent.

Urophlyctis plurianulata (B. & C.) Farl. Not frequent but sometimes locally abundant on *Sanicula* in both southern and northern Wisconsin. On *Zizia aurea* it has been seen in but one station. This was in 1907 and no trace of it was found on this host at the station in subsequent years.

Albugo bliti (Biv.) Kuntze. Frequent and abundant on *Amaranthus retroflexus* and *hybridus*, often with development of abundant and conspicuous oospores; infrequent on other species and on *Aconita*.

Albugo portulacae (DC.) Kuntze. Not infrequent and sometimes abundant.

Albugo candida (Pers.) O. Kuntze. Frequent and often abundant on various Cruciferae.

Albugo tragopogonis (DC.) S. F. Gray. Frequent, although on some of the hosts it is but rarely seen. It is more frequent prob-

ably on *Cirsium muticum* than on any other of the hosts. It is sometimes very abundant on cultivated *Tragopogon*.

Phytophthora thalictri Wilson & Davis. This occurs throughout the state and is collected every year. There are no collections on *Thalictrum dioicum*. As *T. revolutum* occurs in but the southeastern corner of the state *T. dasycarpum* is the usual host.

Phytophthora infestans (Mont.) DBY. In Wisconsin, as elsewhere, there is wide fluctuation in the frequency and abundance of this parasite.

Bremia lactucae Regel. Frequent and abundant, especially on *Lactuca spicata*. It has not been collected often on cultivated lettuce in the open but is often abundant under glass.

Plasmopara humuli Miyabe & Takahashi. In southeastern and southwestern Wisconsin. A scanty development has been seen also in central Wisconsin. It appears to be indigenous. It was collected at Caryville in the Chippewa valley in July, 1920, with oospores.

Plasmopara pygmaea (Unger) Schroet. Frequent and abundant on *Hepatica* and *Anemone quinquefolia*. The var. *fusca* (Pk.) Davis has been collected in southern Wisconsin and on *Hepatica* only. This form is peculiar in not developing conidia.

Plasmopara ribicola Schroet. Although some of the hosts occur throughout the state this has been observed in the northern part of the state only, the southernmost localities being in Shawano county. Within its range it is not infrequent and fairly abundant on the hosts of northern range *Ribes prostratum* and *R. triste*.

Plasmopara geranii (Pk.) Berl. & DeToni. Widely distributed on *Geranium maculatum*.

Plasmopara obducens Schroet. Frequent throughout the state in spring, less so in summer when it is more often found northward.

Plasmopara acalyphae Wilson. This has been found only at a station near Madison and in very small quantity at Caryville. It is inconspicuous and as a rule very few conidiophores are developed. [Since collected at Arena and at Lone Rock and a trace at Oconto.]

Plasmopara viticola (B.&C.) Berl. & DeToni. A common and abundant species.

Plasmopara australis (Speg.) Swingle. Frequent and abundant in the southwestern quadrant of the state.

Plasmopara viburni Pk. The only Wisconsin collections were made at two localities in Marinette county in August, 1913.

Plasmopara cephalophora Davis. While this has been recognized but recently it has been collected on the banks of the Wolf, the Wisconsin, and the Chippewa rivers and is probably not rare.

Plasmopara halstedii (Farl.) Berl. & DeToni. Frequent and abundant. It is perhaps a congeries of host-linked races. It usually occurs upon a single species of host at any particular station.

Peronospora schleideni Unger. This is reported to have occurred sporadically and sparingly about Madison.

Peronospora urticae (Lib.) DBy. This was recorded by Trelease in the Preliminary List of Parasitic Fungi of Wisconsin (1884) as having been collected at Kirkland (now Devils Lake) and La Crosse. Dr. E. A. Burt kindly examined the Trelease herbarium at the Missouri Botanical Garden and found a specimen from "Kirkland." No collections have been made since in Wisconsin.

Peronospora polygoni Thuem. This has been collected in the southwestern part of the state along the Mississippi and lower Wisconsin and Chippewa rivers and in Kenosha county in southeastern Wisconsin.

Peronospora effusa (Grev.) Rabh. Frequent and abundant especially on *Chenopodium album*.

Peronospora obovata Bon. A single collection made in 1911. The host is rare in Wisconsin.

Peronospora silenes Wils. Collected at Necedah and Adams only. Local.

Peronospora alsinearum Casp. Observed at Racine and Madison only. Local and not permanently established.

Peronospora ficariae Tul. Rather common throughout the state.

Peronospora corydalis DBy. Rare and local. It has been collected in the southern part of the state only.

Peronospora parasitica (Pers.) Tul. Frequent and abundant on various species of Cruciferae. It is probably a group of host-linked races.

Peronospora potentillae DBy. Not infrequent on *Agrimonia*, *Geum* and *Potentilla* and perhaps includes three races which are host adapted.

Peronospora rubi Rabh. Infrequent. Most of the collections were made in northern Wisconsin but in 1920 it was found along the railroad at Blue Mounds where leaves infected by *Caeoma* seemed to be more susceptible. One of the specimens from northwestern Wisconsin is on leaves bearing *Caeoma*.

Peronospora trifoliorum DBy. This is rather frequent in alfalfa fields but not destructive in Wisconsin. There is but a single specimen each on *Lupinus* and *Astragalus* in the herbarium, both from western Wisconsin.

Peronospora viciae (Berk.) DBy. This occurs rather frequently in the pea fields but does not do much damage to the crop.

Peronospora viciae americana Davis. Local on *Vicia americana* mostly in the western part of the state.

Peronospora chamaesycis Wils. This is probably more frequent than the small number of specimens would indicate as it is not conspicuous.

Peronospora floerkeae Kell. The collection made at St. Croix Falls by Holway in 1904 is the only one that has been made in Wisconsin.

Peronospora arthuri Farl. Not infrequent on *Oenothera biennis* to which it seems to be confined. It usually shows evidence of systemic infection of the host.

Peronospora alta Fckl. This is a frequent and abundant species.

Peronospora calotheca DBy. Not frequent but sometimes locally abundant. All of the specimens are from the southern half of the state.

Peronospora leptosperma DBy. This is a rare species in Wisconsin, being represented only from the following collections: Racine, 1897; Berryville, 1900; Shiocton, 1917.

Basidiophora entospora Roze & Cornu. This is probably more frequent than the specimens in the herbaria would indicate. It was especially abundant about Madison in 1920.

Sclerospora graminicola (Sacc.) Schroet. This again is doubtless more frequent than the few Wisconsin specimens would indicate.

Protomyces andinus Lagh. This was frequent and abundant on *Bidens* before 1911, but the only collections since were made along the Mississippi river. On *Ambrosia* it has continued to be frequent and sometimes abundant.

HERBARIUM OF THE UNIVERSITY OF WISCONSIN,
MADISON, WISCONSIN, APRIL, 1921

NOTES ON PARASITIC FUNGI IN WISCONSIN—X

J. J. DAVIS

The season of 1921 was characterized by high temperature and low humidity and was consequently unfavorable for the development of most fungous parasites. The low stage of water in the Wisconsin River, however, gave opportunity to explore bottom lands that are ordinarily difficult of access.

After one's conceptions of generalities have changed, there is a lag in the application of such changes to particulars. When the writer began the collection of data on the parasitic fungus flora of Wisconsin there was in his mind a conception of such a flora as something fixed, static; given time and application it could be fully set forth. The fact of quantitative variation was quickly brought home to him and was expressed in his first contribution. More slowly the conception of vegetation as dynamic and mutable has come to be applied to a special group in a local flora. The records are then seen as datum points having a time as well as a space value. This conception increases rather than lessens their value but shows no finality as a goal. It does not however at all lessen the importance of completeness in the record.

The downy mildews as they occur in Wisconsin are interesting from an evolutionary viewpoint. Typically they bear two kinds of spores, summer dispersion conidia and winter resting oospores, and cause local infections. In many species, however, general infection takes place and allows overwintering as mycelium. Such species show a tendency toward suppression of oospores and abundance of conidia. In *Plasmopara pygmaea* (Ung.) Schroet. each of these directions of change seems to have been followed. On *Hepatica* and *Anemone quinquefolia* and *A. canadensis* races producing local infections and both kinds of spores; on *Anemone quinquefolia* a race with general infections and suppression of oospores; on *Hepatica acutiloba* local infections, abundance of oospores and no conidia. The latter is what Peck described under the name *Protomyces fuscus* but which I have designated *Plasmopara pyg-*

maea var. *fusca* (Pk.). I take it that the state with local infections and both spore forms is the older and that the others have been derived therefrom.

Synchytrium scirpi Davis on *Scirpus atrovirens* previously known only from the vicinity of Racine was collected at Oconto in September, 1921, mostly in an abortive state, presumably because of the hot, dry summer. In examining sections of the leaves what appeared to be a Sphaerulina was observed and the following notes made: Perithecia sparse, innate, black, globose, 85-100 μ in diameter; asci sessile, fusoid-cylindrical, 60-70x16-18 μ ; spores long fusoid, slightly curved, hyaline, obtuse, 5-septate, 35-40x5-6 μ ; paraphyses none. The inconspicuous perithecia are too few to warrant taking the material as a type. [In 1922 *Synchytrium scirpi* was collected on the same species of host opposite Sauk City. There is also a specimen from Little Suamico.]

Septoria rubi West. was found by Roark to have an ascigerous stage for which he proposed the name *Mycosphaerella rubi* (*Phytopath.* 11:329, [1921]). Although the *Septoria* is abundant throughout the state he was able to find the *Mycosphaerella* only in Door county which lies between Green bay and lake Michigan.

Piggotia vaccinii Davis ("Notes" IX, p. 436, fig. 3) is doubtless conspecific with *Leptothyrium conspicuum* Dearn. & House (*N. Y. State Museum, Report of the Botanist for 1919*, p. 37, [1922]) and is antedated thereby.

A parasite of *Gentiana Andrewsii* was collected in Wisconsin thirty odd years ago and sent to Ellis who identified it as *Depazea gentianaecola* Fr., but referred it to *Phyllosticta* (see N. A. Phyllostictas No. 176) and it was so recorded in the supplementary list. Baeumler in 1889 recorded as *Leptothyrium*, a fungus on *Gentiana* which he supposed to be the same as the one treated by De Candolle and Fries and used the specific name proposed by De Candolle. In compiling the provisional list there was no time to investigate such matters but simply to follow the Tom Johnson rule, "decide at once and be right half the time." On the principle that things that were equal to the same thing were equal to each other I used Baeumler's binomial. Dr. Brenckle sent me a specimen from North Dakota and I wrote him that it was the fungus recorded in the provisional list under the name *Leptothyrium gentianaecolum* (DC.) Baeuml. and he issued it in *Fungi Dakotenses* under that

name. This fall I took the matter up and find that it can not be referred to *Leptothyrium* but that it agrees with Allescher's description of *Asteroma gentianae* Fckl. (*Rabh. Krypt. fl. Pilze*: 7: 464). I have seen no specimens of *Sphaeria gentianaecola* DC., *Xyloma gentianaecola* DC., *Depazea gentianaecola* (DC.) Fr. and do not know their relationship to our parasite. Neither have I seen a specimen of Fuckel's *Asteroma gentianae*. As matters stand now, I am inclined to use Fuckel's name provisionally, as the fungus has the characters of *Asteroma*. [In 1922 this was collected on *Gentiana puberula* at Arena. Sometimes the proximal portion of the pycnidial wall is thin but distinct while the distal portion is thick and black while other pycnidia have a thick, black wall throughout.]

Fusidium pteridis Kalchbr. was recorded in Trelease's *Preliminary List of parasitic Fungi of Wisconsin* and was copied therefrom into the provisional list. In "Notes" V, p. 701, a parasite of *Pteris* was recorded under the name *Gloeosporium leptospermum* Pk. which is the same fungus. *Gloeosporium pteridis* Hark. as represented by Griffith's *West American Fungi* 324 and 324a and Jackson's No. 1688 is the same species. The synonymy is

Fusidium pteridis Kalchbr.

Gloeosporium pteridis Hark.

Gloeosporium leptospermum Pk.

Gloeosporium pteridis (Kalchbr.) Kabat & Bubak.

It is said to be a sporuligerous state of *Cryptomyces pteridis* (Reb.) Rehm. (*Gloeosporium obtogens* Syd. *Ann. Mycol.* 2:172), C. F. Baker, *Pacific Slope Fungi* 3757 can hardly be other than a profusely developed state of the same parasite. Another parasite of *Pteris* was recorded in the provisional list under the name *Marssonina necans* (E. & E.) Magn. The sporules of this fungus are developed in a pycnidium and it is referable to *Ascochyta* and does not differ from *Ascochyta pteridis* Bres. as represented in Krieger's *Fungi Saxonici* 989. The synonymy is:

Gloeosporium necans Ell. & Evht. *Journ. Mycol.* 4: 104, (October, 1888).

Marsonia necans (E. & E.) Sacc.

Marssonina necans (E. & E.) Magn.

Ascochyta pteridis Bres. *Hedwigia*, 1894.

Ascochyta necans (E. & E.) n. comb.

In specimens of *Ramularia desmodii* Cke. on *Desmodium illinoense* the penicillate conidiophoral fasciculi sometimes exceed 100μ in length.

In examining a collection of *Cerosporella cana* Sacc. on *Erigeron annuus* it was observed that the conidiophores ranged up to 100μ in length.

Specimens on leaves of *Crataegus* collected in 1890 were referred to Mr. J. B. Ellis for determination who reported as follows: "9039. *Phleospora oxyacanthae* (Kze. & Schm.) I think it must be, but your specimens are much better than any I have in my European collections." At the close of the letter he wrote: "I have had to examine the things in great haste but I think you will find them correct." In the Supplementary List the fungus was recorded under this name and carried from there to the Provisional List where by a slip the specific name was given as "crataegi". This was corrected in "Notes" III p. 254 and some remarks on the character of the parasite added which indicated that it could not be a *Phleospora*. To the notes there given, I would add that in some specimens the conidia have divided at some of the septa resulting in shorter conidia which sometimes becomes thicker, $15-45\times 3-7\mu$. This is quite different from *Phleospora oxyacanthae* (Kze. & Schm.) Wallr., but appears to be *Cercospora mirabilis* Pk., for a specimen of which I am indebted to Dr. House which, however, lacks the differentiated conidiophores of *Cercospora*.

The first Wisconsin collection of *Cercospora* on *Smilax* was made at Racine. It was a form with small spots and preponderance of the dark border and was referred to *Cercospora mississippiensis* Tracy & Earle. Subsequent collections lead me to believe that there is but one species on *Smilax* in Wisconsin and that it is *C. smilacis* Thuem., as described and figured by Peck (33d Report, p. 29, figs. 1-3). In different collections the spots vary from 1 to 8 mm. in diameter, the border varies in width and intensity of color, the conidiophores are longer or shorter ($30-83\times 4\mu$) and the conidia are variable in size ($30-115\times 4-5\mu$) and depth of color. They may be attenuate or subcylindrical and obtuse and, with the conidiophores, vary in septation. *Fungi Columbiani* 2208 labeled *Cercospora mississippiensis* Tracy & Earle I have referred to *C.*

smilacis Thuem. Saccardo however thought the parasite described and figured by Peck to be distinct from *Cercospora smilacis* Thuem. and called it *C. smilacina* Sacc. (*Michelia* 2: 364). I have not seen European specimens but Peck accepted von Thuemen's description as applying to his species (*33d Report*, explanation of plate 2, footnote).

A collection of *Cercospora davisii* E. & E. on *Melilotus alba* made at Madison in June 1921 (Bensaude, McFarland, & Davis) bears conidiophores up to 140μ in length. Evidence accumulates that length of conidiophores and conidia in this and similar genera as a specific character is to be used with caution. A *Cercospora* occurring on dark areas on branches of *Melilotus alba* at Gays Mills is referred to this species. The conidia seen were only about 3μ thick.

Cercospora epigaeina Davis (*Trans. Wis. Acad.* 16: 758) is evidently not distinct from *C. epigaeae* Ell. & Dearn. which is the older name.

Examination of a collection of *Cercospora saniculae* Davis from Blue Mounds shows that when not crowded the conidiophores are not always straight, that they sometimes occur on the upper leaf surface and that the longest ones may attain a length of 60μ .

Cercospora platyspora Ell. & Holw., is doubtfully distinct from *Cercospora sii* E. & E. and from *Fusicladium depressum* (B. & Br.) Sacc. Specimens on Angelica were issued in *Fungi Columbiani* 1924 under the name *Didymaria platyspora* (Ell. & Holw.), but *F. Col. 4230* on *Taenidia integerrima* is labeled *Fusicladium depressum* (B. & Br.) Sacc.

In a collection of *Cercospora stomatica* Ell. & Davis made at Woodman, July 4, 1921, the conidia are narrow (about 3μ) and of nearly uniform diameter throughout. A result perhaps of the hot, dry season.

Doassansia ranunculina Davis which had not been seen in Wisconsin for upwards of 20 years was collected at Shiocton in September, 1921. Although the host was abundant there was but very scanty development of the parasite.

Puccinia zygadeni Trel. is merged into *P. atropuncta* Pk. & Cl. in *North American Flora*.

ADDITIONAL HOSTS

Not previously recorded as bearing the fungi mentioned in Wisconsin.

It is customary in collecting in Wisconsin to find each year sori of *Synchytrium* on an additional host at a single station and in small quantity and they have usually been referred to *Synchytrium aureum* Schroet. Such a collection was made July 25, 1921, on leaves of *Acalypha virginica* in the Wisconsin River bottom lands at Lone Rock. In this collection the sori are first pale yellow becoming castaneous with age. The galls are hypophylloous, discrete, hemispherical, but little larger than the sori which are globose to elliptical, 125-175 μ in diameter with wall about 5 μ thick.

[Collected in 1922 at Arena and Prairie du Sac.]

Peronospora ficariae Tul. On *Ranunculus recurvatus*. Ridge-way.

Peronospora calotheca DBY. This was collected in small quantity on *Galium asprellum* at Madison in November, 1920.

Basidiophora entospora Roze & Cornu. On *Aster lateriflorus*. Muscoda.

Erysiphe cichoracearum DC. On *Vernonia fasciculata* and *Helenium autumnale*. Muscoda.

Phyllactinia corylea (Pers.) Karst. On *Betula nigra*. Richland County opposite Muscoda.

Phyllachora graminis (Pers.) Fkl. On *Elymus brachystachys*. Richland County opposite Muscoda.

A Phyllachora forming black patches with effused ascomata on leaves of *Panicum virgatum* has been collected at Muscoda. Provisionally it is labeled *Ph. graminis panici* (Schw.) Shear although it differs widely in macroscopic appearance from specimens on other species of *Panicum*.

Phyllachora ambrosiae (B. & C.) Sacc. (*Physalospora ambrosiae* E. & E.). On *Ambrosia psilostachya*. Muscoda.

Pseudopeziza singularia Pk. On *Ranunculus septentrionalis*. Blue River and Iowa County opposite Lone Rock.

Phyllosticta apocyni Trel. On *Apocynum androsaemifolium*. Ridgeway.

Ascochyta pisi Lib. On *Vicia angustifolia segetalis*. Barneveld and Ridgeway.

Ascochyta lophanthi lycopina Davis. This has been collected on *Lycopus virginicus* and it is quite possible that other collections are on this species of host.

Darluca filum (Biv.) Cast. On *Puccinia asteris* growing on *Aster Tradescanti*. Blue River. Two telial hosts were given in "Notes" VI, p. 707.

Septoria annua Ell. & Evht. On *Poa annua*. Black Earth. (McFarland & Davis.)

Septoria caricinella Sacc. & Roum. A specimen on *Carex chordorrhiza* from Lost Lake, Vilas County (July 4, 1901) is referred to this species.

Septoria polaris Karst. Specimens on *Ranunculus septentrionalis* from Richland County opposite Muscoda are provisionally referred to this species. The sporules are $20-30 \times 1-1\frac{1}{2}\mu$.

Septoria oenotherae West. On *Oenothera rhombipetala*. Muscoda.

Septoria sii Rob. & Desm. On *Cicuta bulbifera*. Oconto.

Septoria solidaginicola Pk. On *Solidago patula*. Cecil. *Aster lateriflorus*. Woodman. Of the latter collection it was noted "not abundant on this host and some of the spots atypical".

Septoria atropurpurea Pk. On *Aster paniculatus*. Lone Rock. The strongly curved sporules range up to more than $100 \times 1\frac{1}{2}-2\mu$.

Phleospora ulmi (Fr.) Wallr. On *Ulmus fulva*. Richland County opposite Boscobel. Sporules mostly about $30 \times 7\mu$.

A Marssonina on leaves of *Salix lucida* collected at Shawano I do not distinguish from forms on *Populus* and have labeled it *Marssonina populi* (Lib.) Magn. The acervuli are amphigenous but more abundant and better developed below where they have a resinous appearance. The curved sporules are $13-17 \times 3-4\mu$. A collection on *Populus balsamifera* from Little Suamico has hypophyllous subcuticular acervuli with sporules $11-17 \times 3\frac{1}{2}-5\mu$.

Marssonina potentillae (Desm.) Magn. On *Fragaria virginiana*. Crandon and Little Suamico. Of the latter collection it was noted —Immaculate, sporules $17-24 \times 3\frac{1}{2}-6\mu$. On *Potentilla anserina*. Oconto.

Septocylindrium concomitans (Ell. & Holw.) Hals. On *Bidens vulgata puberula*. Wauzeka.

Ramularia uredinis (Voss) Sacc. On *Salix amygdaloides*. Oconto.

Ramularia fraxinea Davis. On *Fraxinus americana* (?) Gays Mills and Blue River. This parasite has been seen only in river bottom lands.

Ramularia effusa Pk. On *Gaylussacia baccata*. Ridgeway. Apparently causing defoliation.

Ramularia dispar Davis. A collection on *Eupatorium urticaefolium* from Crandon is referred to this species.

In a specimen on *Solidago serotina* from Gays Mills the conidiophores are mostly subulate, $10-20 \times 3\mu$, the conidia fusiform to cylindrical, $7-36 \times 2\mu$. This was referred to *Ramularia virgaureae* Thuem.

Scolecotrichum graminis Fkl. On *Dactylis glomerata*. Madison. (Bensaude, McFarland & Davis.)

Cercospora diffusa Ell. & Evht. On *Physalis heterophylla*. Oconto.

Cercospora antipus Ell. & Holw. On *Lonicera Sullivantii*. Werley. The brown, tufted conidiophores are $40-70 \times 3\mu$.

Ustilago striaeformis, (West.) Niessl. On *Agrostis alba*. Madison. (W. H. & J. J. Davis) Collected also on *Poa pratensis* at Madison by W. H. Davis.

Urocystis agropyri (Preuss) Schroet. On *Agrostis alba*. Madison. (W. H. Davis)

Entyloma ranunculi (Bon.) Schroet. Conidiophorous material on *Thalictrum dasycarpum* collected at Oconto September 8, 1921

I can not distinguish from this species either in the field or in the herbarium. Typical material of *E. thalictri* Schroet. was collected in the same locality.

Uromyces appendiculatus (Pers.) Lk. Uredinia on *Strophostyles helvolia*. Richland County opposite Blue River.

Puccinia graminis Pers. Uredinia on *Poa annua*. Black Earth. (McFarland & Davis). Spores 17-24x13-17 μ .

Puccinia peridermiospora (E. & Tr.) Arth. On *Fraxinus pennsylvanica* and var. *lanceolata*. These are probably the most susceptible hosts of the Aecidium in Wisconsin.

Puccinia polygoni-amphibii Pers. Uredinia on *Polygonum Persicaria*. Oconto.

Pucciniastrum myrtilli (Schum.) Arth. Uredinia on *Gaylussacia baccata*. Oconto.

Aecidium dicentrae Trel. the type locality of which is in Wisconsin has been shown by Mains to be the aecial stage of a Melampsoraceous rust on *Laportea canadensis* (*Am. Journ. Bot.* 8: 445) which has been collected in Wisconsin at Hannibal, Jump River, Holcombe and Blue Mounds. For this Dr. Mains proposes the binomial *Cerotelium dicentrae* (Trel.) Mains & Anderson, a name which does not accord with the usage followed in this series of notes. [See Saccardo: *De Diagnostica et Nomenclatura Mycologica; admonita quaedam* (*Annales Mycologici* 2:197.) English translation in *Journal of Mycology* 10:111-2.] I am therefore using *Cerotelium urticastri* Mains (*loc. cit.* 451).

ADDITIONAL SPECIES

Not previously recorded as occurring in Wisconsin.

In August 1892 a *Synchytrium* on *Ranunculus recurvatus* was collected in Kenosha County and the following description written and filed with the specimen. As it was not seen again, however, some doubt arose as to its being distinct and it was recorded under *S. aureum* Schroet. in the provisional list which is doubtless an aggregate species as treated in Wisconsin. In 1921 it was found on *Ranunculus septentrionalis* at the base of the Wisconsin River bluff in Iowa County opposite Spring Green readily recognizable as being the same as the original collection. I therefore publish the description.

Synchytrium cinnamomeum n. sp. Galls cinnamon brown, hemispherical to obtusely conical, scattered or aggregated, frequently confluent, $125-150\mu$ in diameter; resting sori solitary, globose to elliptical to pyriform, $42-66\mu$ in the longer diameter; wall brown, contents brown black, granular. On petioles and leaves of *Ranunculus recurvatus*, Somers, Wisconsin, August 13, 1892 (type). *Ranunculus septentrionalis*, Iowa County opposite Spring Green, July 20, 1921. Readily recognized by the brown color which suggests rust.

Synchytrium nigrescens n. sp. Sori hypophyllous, scattered, subepidermal, at first pale yellow with abundant oil content, becoming black with content in part black and granular, spherical to ovoid $80-180\mu$; wall thin, homogeneous, chitinous, black by reflected, fuscous by transmitted light, outer surface smooth or minutely tuberculate. But slight prominences are produced, the sori often extending through to the upper epidermis without causing hypertrophy. On *Aster lateriflorus* on bottom lands of the Wisconsin river at Spring Green, Lone Rock and Blue River.

Plasmopara illinoensis (Farl.) n. comb. On *Parietaria pennsylvanica*. This was described by Farlow (*Bot. Gaz.* 8: 332 [1883]) from collections made by Seymour at Quincy and Camp Point on the Mississippi river in southern Illinois. No further collections seem to have been made. Guy West Wilson gave a new description and referred it to his proposed genus *Rhysotheca* (*Bull. Torr. Bot. Club* 34: 407 [1907]). In 1921 it was collected at Blue Mounds, Ridgeway, Fennimore, Werley and Woodman. A collection from Blue Mounds made July 9 contains globose oospores $23-30\mu$ in diameter with wall $3-5\mu$ thick filling the rather thin-walled oogonia. Assuming that southern Wisconsin is the northern limit of this species its development was probably favored by the abnormally hot season of 1921.

Phacidium taxi Fr. On *Taxus canadensis*. Crandon. The exiple is thick and black and ruptures irregularly in the center. The asci are clavate-cylindrical, about $50\times 6\mu$. No mature spores were seen.

Claviceps nigricans Tul. Sclerotia on *Eleocharis palustris*. Sturgeon Bay (J. E. Sanders), Madison (J. R. Heddle).

Phyllosticta congesta Heald & Wolf (*Mycologia* 3: 8). On *Prunus pennsylvanica*. Devils Lake (C. E. Owens).

Phyllosticta pyrolae Ell. & Evht. Collected in small quantity and not quite mature on leaves of *Pyrola elliptica* at Blue Mounds.

Phyllosticta steironematis Dearn. & House. On *Steironema ciliatum*. Lone Rock.

Phyllosticta verbascicola Ell. & Kell. On *Verbascum Thapsus*. Barneveld.

Phoma alliicola Sacc. & Roum. A collection on *Allium canadense* from Madison is referred to this species. The ostiole is often gaping, the sporules $4-6 \times 2-3 \mu$.

Macrophoma arenis n. sp. Pycnidia black, scattered, subepidermal, globose, $130-150 \mu$ in diameter; sporules narrow ovoid, becoming subfuligenous, $27 \times 10 \mu$ at maturity. On more or less of the distal portion of leaves of *Koeleria cristata* which become sere and involute. Boscobel, Wisconsin, July 5, 1921.

Asteromella astericola n. sp. Pycnidia epiphyllous on indefinite purple areas in compact orbicular groups, black, globose, $100-165 \mu$ in diameter; wall parenchymatous of dark firm cells $6-10 \mu$ in diameter; sporules sessile (?), hyaline, terete to fusoid-cylindrical, mostly straight, $20 \times 30 \times 3-4 \mu$. On *Aster lateriflorus*, Blue River, Wisconsin, August 3 and 4, 1921. It may be that this is a better developed form of *Asteromella asteris* Pk. (Report for 1912, p. 38).

Stagonospora albescens n. sp. Spots orbicular, sordid white, $\frac{1}{2}-2$ mm. in diameter surrounded by a broad indeterminate reddish brown border; pycnidia few, innate, dark brown, globose, thick walled, about 150μ in diameter; sporules hyaline, fusoid-cylindrical, straight or sometimes curved, 5-7 septate, $45-67 \times 10-13 \mu$. On living leaves of *Carex tribuloides*. Muscoda, Wisconsin, October 1920. Macroscopically this resembles *Septoria caricinella* Sacc. sufficiently to have been mistaken for it in the field. The contents of the cells or cytoplasmic divisions are homogeneous.

May 13 and 19, 1921, spots were observed on leaves of a few plants of *Melilotus alba* at a station near Madison. The following notes have been made from these collections: Spots definite, circular to elliptical to irregular, argillaceous with a paler center, 1-10 mm. in diameter; pycnidia in the paler area, hypophyllous, exceptionally epiphyllous also, brown, globose to lenticular, ostiole circular with a dark margin about 30μ across, $135-165 \mu$ in diameter;

sporules cylindrical, hyaline, usually straight, sometimes slightly curved or bent, 1-3 septate, about 20 ("13-23", "10-27") \times 3-3 $\frac{1}{2}$ μ . I have labeled it *Stagonospora meliloti* (Lasch) Petr.

Three collections on leaves of *Acer Negundo* were made in 1921 that were referred to *Septoria negundinis* Ell. & Evht. They are evidently members of the acericolous group referred to in "Notes" I, pp. 81-2. In the collection from Werley the round arid spots are but 2 to 3 times the diameter of the usually solitary pycnidia and the curved sporules 32-40 \times 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ μ indistinctly 3-septate. This is much like *Septoria saccharina* Ell. & Evht. The collection from Barneveld is similar with slightly greater range in spore length and septation not apparent. In the collection from Madison (Bensaude, McFarland & Davis) the spots are pale argillaceous with a narrow raised darker margin, amphigenous, circular to angular in outline, 1-3 mm. in diameter, often confluent; pycnidia one to few on the spot, hypophylloous, subepidermal, globose to lenticular, up to 180 μ in diameter; sporules hyaline becoming curved and 3-septate, 25-40 \times 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ μ . A collection made at Galesville in 1914 and recorded in "Notes" III, p. 264, as *Septoria acerella* Sacc. but belonging with these is similar, the sporules being 23-33 \times 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ μ becoming curved and triseptate. In this collection indefinite leaf areas upon which the small spots are numerous become dead and brown. In examining this epiphyllous subcuticular acervuli were seen bearing oblong hyaline sporules 10-13 \times 4 μ . These collections are evidently *Septoria acerella* Sacc. as treated by Ellis in *Septorias of North America* No. 160 (*Journ. Mycol.* 3: 79) but subsequently described by Ellis & Everhart as a new species for which the name *Septoria negundinis* was proposed in the *Proceedings of the Academy of Natural Science, Phila.* for 1893, p. 165.

Of a *Septoria* on Caeoma-infected leaves of *Rubus allegheniensis* collected at Madison June 2, 1921, the following notes were made: Spots epiphyllous, circular to angular, subolivaceous, immarginate, 1-5 mm. in diameter, often confluent; sporules hyaline, usually curved, continuous, 30-50 \times 1-2 μ . While it is possible that this is a form of *Septoria rubi* West. modified by the character of the substratum it has been kept separate under the name *Septoria comitata* n. sp. ad interim.

Septoria lycopi Pass. Collected on *Lycopus uniflorus* on the river bottoms opposite Muscoda in October 1920. This was a dry

season and the sporules are not well developed, being but about $30 \times 1\frac{1}{2}\mu$.

Cylindrosporium caryogenum Ell. & Evht. On *Carya cordiformis*, Werley and Woodman. This bears some resemblance to *Microstroma* in the field.

Of a collection on *Aster sagittifolius* obtained at Woodman July 4, 1921, and referred to *Septoria solidaginicola* Pk. the following notes have been made: Spots angular, limited by the veinlets, becoming confluent, reddish brown to pale brown, without halo, 2-7 mm. long, 1-2 mm. wide; pycnidia epiphyllous-innate, globose to ovoid, often with a black ring around the ostiole which is sometimes conical, $60-90\mu$ in diameter; sporules $30-36 \times 1-1\frac{1}{2}\mu$. *Septoria angularis* Tharp to which, judging from the description, this bears resemblance was described as having pycnidia $75-80 \times 100-200\mu$ and sporules $35-50 \times 3\mu$ (*Texas Parasitic Fungi, Mycologia* 9: 121). The name is antedated by *Septoria angularis* Dearn. & Barth. (*Mycologia*, 8: 103) on *Solidago latifolia* (Ontario, Dearnness) in which the spots are said to be limited "when the pycnidia are well developed by a narrow, raised, sharply defined border". The collection on *Aster sagittifolius* here referred to is quite similar to this as represented in *Fungi Columbiani* 4875. There seems warrant for the suspicion expressed by the authors that this may be *Septoria fumosa* Pk.

Phleospora anemones Ell. & Kell. On *Anemone virginiana*. Iowa County opposite Lone Rock. This forms a well-developed pycnidium and might be referred to *Septoria* without doing violence.

Cylindrosporium guttatum Wint. What is perhaps this species was collected on *Hypoxis hirsuta* at Blue Mounds bearing lunate sporules but $18-24 \times 2\mu$. From the examination it was thought that the short sporules might have been formed by division as in the acervuli (?) were found longer straight ones.

Cylindrosporium toxicodendri (Curt.) Ell. & Evht. On *Rhus toxicodendron*. Barneveld and Lone Rock. *Septoria irregularis* Pk. as represented by a specimen collected by Peck at Bolton Landing, N. Y., is the same fungus.

Septogloeum quercum n. sp. Spots or areas indefinite, becoming mottled brown; acervuli hypophyllous, subcuticular, sporules sessile, hyaline, falcate, 7-9 septate, $35-50 \times 5-7\mu$. On languishing

leaves of *Quercus bicolor*. Blue River, Wisconsin, August 2, 1921. Exceptionally straight conidia occur while some might perhaps be called rostrate.



Fig. 1. Vertical section of acervulus of *Septogloeaum quercum* n. sp. on leaf of *Quercus bicolor* with sporules in various stages of development. Drawn by E. M. Gilbert with the aid of camera lucida.

[This was collected again in 1922 and was grown on nutrient agar by Miss Helen Johann and in addition to the conidia there was development of pycnidia with spermatoiod contents. Later a collection was made at Blue River that no longer bore conidia on the lower surface but with pycnidia on the upper surface with spermatoiod, imperfectly developed, contents. Some of these leaves were kept in a moist chamber by Miss Johann and developed hyaline, globose, delicate walled sporules $3-4\mu$ in diameter. When germinating in water these sporules developed first a bud and then bud and sporule developed each a germ tube. Often the bud was nearly and sometimes quite as large as the sporule. Later (Sept. 2) a collection was made at Arena with similar sporules in the pycnidia and acervuli on the lower leaf surface. For the purpose of filing I have designated this pycnidial state *Phyllosticta quercicola* n. sp. ad interim.

In circular groups or later on orbicular brown spots or irregular areas; pycnidia epiphyllous, immersed in the palisade layer, dark brown, globose to elliptical, the longer axis parallel with the palisade cells, $60-100\mu$ in diameter; sporules hyaline, globose, delicate walled, $3-5\mu$ in diameter. On leaves of *Quercus bicolor*. Arena and Blue River, Wisconsin.

From observation of the cultures Miss Johann is of the opinion that the *Septogloeaum* and the *Phyllosticta* represent distinct organisms, the mycelium of the former growing very slowly, that of the latter much more rapidly. By placing leaves in a moist chamber she brought about the development of sporules in which one or

two of the cells is divided by a vertical septum. She is quite sure that these are a further development of the sporules represented in fig. 1.]

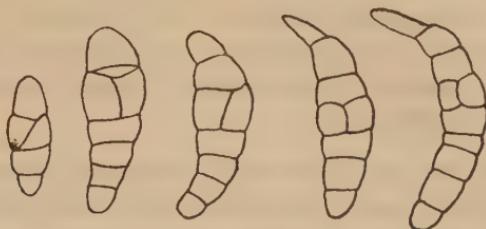


Fig. 2. Selected sporules from leaf of *Quercus bicolor* kept in a moist chamber. Drawn by Helen Johann with the aid of camera lucida.

Ramularia tanaceti Lind. On *Tanacetum vulgare*. Fennimore. Epiphyllous tufts sometimes occur.

Cercospora celtidis (Ell. & Kell.) n. comb. (*Ramularia celtidis* E. & K. *Journ. Mycol.* 1: 75). On *Celtis occidentalis*. Bank of Wisconsin river opposite Boscobel. Well characterized by the short conidiophores. The slender, filiform conidia up to 75μ in length are more nearly of the Cerosporella type. To their description the authors appended the statement "approaches Cercospora".

Of a collection on ash leaves in 1921 the following notes were made: Spots epiphyllous, orbicular, sordid white with a reddish brown to black border, 1-2 mm. in diameter; conidiophores fuscous, single or in small fascicles, more or less irregularly undulate and finely denticulate toward the apex, simple, septate, $40-100\times 3\mu$; conidia brown, uniseptate, about $13\times 4\mu$. On leaves of *Fraxinus pennsylvanica*. Blue River. This has been provisionally labeled *Cladosporium simplex* Schw. of which I have not seen an authentic specimen. It may be that the Cladosporium is not the cause of the spots.

Cladosporium astericola Davis. On leaves of *Solidago serotina*. Lone Rock.

Cercospora molluginis n. sp. Showing first small pallid spots but the infected leaves becoming sere and yellow before the appearance of the fasciculi which blacken the areas upon which they appear; conidiophores amphigenous, fasciculate, fuligenous, suberect or sometimes curved, undulate or geniculate, simple, usually con-

tinuous, 25–65x3–4 μ ; conidia subhyaline, slender, tapering, straight or slightly curved, 50–100x3 μ .

On leaves of *Mollugo verticillata*. Lone Rock, July 22, 1921.

Cercospora verbenaे-strictae Pk. On *Verbena stricta*. Lone Rock. The conidia appear before tissue death has occurred and therefore before spotting has appeared. There is but a trace of color in the conidiophores.

Of a specimen on *Lepachys pinnata* from Fennimore the following notes have been made. Leaves mottled above with indefinite slightly paler areas; conidiophores amphigenous, solitary or in small fascicles, brown, straight, curved or undulate, sometimes septate, often subnodulose and geniculate distally, 50–100x3–4 μ ; conidia hyaline, straight, obclavate-cylindrical, becoming septate, 50–100x3 $\frac{1}{2}$ –5 μ . Pending opportunity to examine more material I have placed this with *Cercospora ratibidae* Ell. & Barth.

Ustilago sphaerogena Burrill was collected on *Echinochloa crus-galli* near Millville in 1913 but has not been recorded in the "Notes". It was collected again on the same species of host at Madison in 1921 by a class in mycology.

UNIVERSITY OF WISCONSIN HERBARIUM,
MADISON, WISCONSIN, APRIL, 1922.

NOTES ON PARASITIC FUNGI IN WISCONSIN—XI

J. J. DAVIS

The Synchytrium that has been reported as occurring in Wisconsin on *Lycopus* and referred to *Synchytrium aureum* Schroet. has been found to develop summer sori and consequently cannot be a form of that species. As the summer sori develop an empty basal cell I am now referring it to *Synchytrium cellulare* Davis. The galls of the summer sori are simpler than in the type of that species on *Boehmeria cylindrica*. The summer sporangia are globose to polyhedral, 18–24 μ in diameter. The resting sori sometimes develop in prominent multicellular galls. I am now labeling this var. *lycopodis* n. var. In addition to the ordinary host, *Lycopus uniflorus*, one collection has been made on *L. americanus*. Vestergren's *Micromycetes rariores selecti* 1673 is the form referred to. It may be that forms on other hosts in Wisconsin that have been referred to *S. aureum* will be found to form summer sori when collections have been made at the proper time.

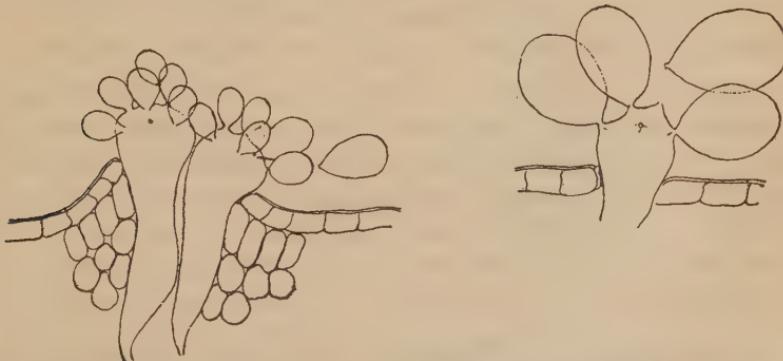


FIG. 1. Left, two conidiophores of *Plasmopara kellermani* bearing conidia. Right, apical portion of a conidiophore with conidia more highly magnified. Drawn by E. M. Gilbert with the aid of camera lucida.

The record of *Iva xanthifolia* as a host of *Albugo tragopogonis* (D.C.) S. F. Gray in the provisional list was an error, the fungus on that host being *Plasmopara kellermani* (Ell. & Hals.) Swingle.

It has been collected at Spooner, Dresser Junction and Alma. This differs from *Basidiophora* in the intrafoliar origin of the conidio-phores and the absence of distinct basidia. From *Albugo* it differs in the conidia being borne in a cluster on the apex of the conidio-phore instead of being catenulate.

Circular black spots 3-4 mm. in diameter sometimes occur on leaves of *Vitis vulpina* and *Vitis bicolor* in Wisconsin. They appear like a young stage of *Rhytisma* but have been seen only on living leaves in summer.

The parasite of *Ulmus americana* and *U. racemosa* recorded in "Notes" VI, p. 11, under the name *Phyllosticta ulmicola* Sacc. is referred to *Ph. melaleuca* E. & E. in *North American Flora* 6: 67.

In the provisional list a parasite of *Prunus virginiana* was recorded under the name *Phyllosticta destruens* Desm. regarding which a note was published in "Notes" I, p. 79. For this I am now using the binomial *Phyllosticta virginiana* (Ell. & Hals.) Seaver (*N. A. Flora* 6¹: 70). This is not a typical *Phyllosticta* inasmuch as the sporules are formed by successive basipetal divisions of filaments the proximal, as yet undivided, portions of which I take to be the "long sporophores" mentioned in the description of the similar *Ph. innumarabilis* Pk. in *N. A. Flora* 6¹: 52. The microconidia, of some species at least, of *Cylindrosporium* are produced in the same way. The form on *Amelanchier* has been collected in Wisconsin on hosts referred to *A. oblongifolia* and *A. spicata*.

The *Septoria* which occurs on *Cacalia atriplicifolia* in Wisconsin produces white arid spots with a more or less broad dark purple border like those of *S. nabali* B. & C. Specimens from Missouri and Kansas are similar. The single specimen on *Cacalia reniformis* has brown spots with a narrow darker border. This developed in a moist deeply shaded station while those on *C. atriplicifolia* developed in the open where they were exposed to the direct rays of the sun.

The parasite of *Spiraea* described by Trelease under the name *Ascochyta salicifoliae*, referred to *Septoria* by Berlese & Voglino and to *Cylindrosporium* in "Notes" IV, p. 673 is referred to *Phleospora* by Petrak (*Ann. Mycol.* 20: 210-11). I quite agree with those who see the genus *Phleospora* as a mixture of species referable to other genera and hence one that should be dropped as was done by Diedicke in *Kryptogamenflora der Mark Brandenburg* and by Migula in Thome's *Flora von Deutschland*.

For the species recorded in the provisional list as *Ovularia obliqua* (Cke.) Oud. the name *O. monosporia* (West.) Sacc. should be used because of priority (*Sylloge Fungorum* 22: 1296).

A collection on *Mentha arvensis canadensis* made at Arena in September and referred to *Ramularia variata* Davis bears conidia but about 1μ thick.

When well developed the conidia of *Cercospora ampelopsis* Pk. are obclavate $60-80\times 5-6\mu$.

The conidial tufts of *Cercospora galii* Ell. & Hol. are usually red until death of the host-tissue takes place. Fasciculi of this color are more often seen on the small leaved species of host.

There are a number of Compositae that bear Cercospora of a brown color in both Europe and America. In "Notes" VIII, p. 430 forms on Rudbeckia and Prenanthes were included in *Cercospora tabacina* Ell. & Evht. Until more is known of their relationship to each other it is perhaps better to keep the forms on the different host genera distinct. I am therefore labeling the specimens on Prenanthes *Cercospora brunnea* Pk., although it may be that this is not distinct from *C. prenanthis* Ell. & Kell. as the brown color is not always conspicuous. *C. rudbeckiae* Pk. seems to be a synonym of *C. tabacina* Ell. & Ev. which was published in 1888 not 1886 as given in the *Sylloge Fungorum*. I append notes of a specimen on *Prenanthes alba* collected in Iowa County July 1, 1922. Conidiophores in dense fascicles arising from substomatal, black, stromatoid tubercles, fuligenous, simple, flexuose, sometimes geniculate, continuous or sparingly septate, $50\times 80\times 4\mu$; conidia cylindrical to subclavate, nearly hyaline, straight or curved, $20\times 60\times 3-5\mu$. Macroscopically the angular areas are tobacco brown. The form on Ambrosia issued in *Fungi Columbiani* 2117 under the name *Cercospora racemosa* E. & M. appears to be a member of this group which seems closely related to *C. ferruginea* Fckl. occurring on Compositae in Europe.

Although *Puccinia cryptotaeniae* Pk. was recorded in the fourth supplementary list I find that it was not included in the Provisional list. It has been collected at Racine, Ridgeway, and at the Dells of the Wisconsin River in Adams County.

If one reads the descriptions of *Septoria besseyi* Pk. on *Fraxinus pennsylvanica lanceolata* and *Marssonina fraxini* (Ell. & Davis) on *Fraxinus nigra* they appear to be quite distinct in their micro-

scopic characters while similar macroscopically. In the former the sporules are borne in pycnidia, are obtuse, continuous $40-55 \times$ about 4μ . In the latter they are borne in acervuli, are acute, 1-septate, $17-33 \times 2-3\mu$. Examination of specimens, however, shows that the matter is not as simple as it appears. To illustrate I give some notes of various specimens.

On *Fraxinus pennsylvanica lanceolata*.

- 7-22-21. Pycnidia distally imperfect (hemispherical); sporules subacute to obtuse, becoming 1-septate, $27 \times 50 \times 3\mu$.
- 7-21-22. Pycnidia more or less imperfect; sporules continuous, $40-60 \times 3\mu$.
- 7-7-20. Distal portion of pycnidia imperfect; sporules obtuse or acute at one end, continuous, $30-50 \times 2\frac{1}{2}-4\mu$.

On *Fraxinus nigra*.

- 7-29-20. Pycnidia more or less imperfect; sporules acute, continuous, $27-33 \times 3\mu$.
- 7-1-18. Pycnidia distally imperfect; sporules acute, continuous, $23-32 \times 2\mu$.
- 9-3-15. Pycnidia distally imperfect; sporules acute, continuous, $23-33 \times 3\mu$.
- 8-10-15. Spore bodies ranging from prominent acervuli to innate pycnidia; sporules acute, continuous, $24-36 \times 2-3\mu$.

Fungi Columbiani 1526 on *Fraxinus pennsylvanica lanceolata* from Kansas, issued as *Cylindrosporium fraxini* E. & K., bears sporules which are obtuse, tapering toward one end, becoming 1-septate $33-45 \times 3\mu$ and apparently belongs in this duplex. The character of the spore body in such groups as this appears to depend upon its position in the leaf. The beginning of a spore body is a spherical mass of hyphae in the leaf tissue. A wall develops on the periphery of the hyphal mass and under this protection a sporuligerous or hymenial layer is developed on the inner surface of the wall which gives rise to the reproductive bodies. Normally the pycnidium is globular and the entire inner surface of the wall is lined with hymenium except a small opening for the discharge of the sporules, the ostiole. When, however, the primary hyphal mass is in contact with the epidermis or by destruction of intervening host tissue becomes pressed against it no wall or hymenium is formed by the portion in contact with the epidermis. This results in a pycnidium the distal portion of which is defective. If the

deficiency is considerable the pressure of the mesophyll tends to flatten the remainder and produce an acervular structure. This is more likely to happen in the thinner leaf of *Fraxinus nigra*. In the normal pycnidium the length of the sporule may equal the radius of the pycnidial cavity but in the acervular condition it is limited to the distance from the hymenium to the epidermis.

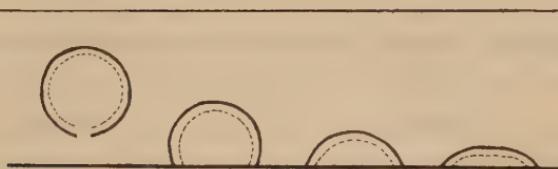


FIG. 2. Diagram to illustrate influence of position of pycnidium with reference to epidermis on its development. Drawn by E. Dopp Jr., from a sketch by the author.

I have seen no specimen that corresponds to the description of *Cylindrosporium fraxini* (E. & K.) E. & E. (*Journ. Mycol.* 1:128), *Cercospora fraxini* E. & K. *loc. cit.* 1:2). As noted above *Fungi Columbiani* 1526 issued under this name appears to belong to the group of forms considered above.

Of the parasite of *Fraxinus oregana* of which *Fungi Columbiani* 4415, 4719, and 4816, issued as *Cylindrosporium fraxini* (E. & K.) E. & E., are examples, I have seen no description. It causes reddish brown spots with a paler margin of more or less circular outline quite variable in size and sometimes confluent. The acervuli are epiphyllous, subcuticular, and soon erumpent. The sporules are cylindrical, usually curved or undulate, becoming about 4-septulate, mostly 40–60 \times 2–3 μ . The epiphyllous, subcuticular habit especially seems to remove this from the forms considered above.

As the range of species of Uredinales in *North American Flora* Vol. 7 is based on specimens in the Arthur herbarium there are sometimes considerable restrictions. For instance the range of *Puccinia aletridis* B. & C. (*Dicaeoma* (?) *aletridis* (B. & C.) Kuntze) is given as "The states bordering the Atlantic Ocean and Gulf of Mexico from Massachusetts to Texas". Its occurrence in northern Indiana was recorded by Burrill (*Parasitic Fungi of Illinois* pt. 1, p. 195) and in Wisconsin by Trelease (*Preliminary List of Wisconsin Parasitic Fungi*, p. 25). It has been collected in Wisconsin as recently as 1922.

ADDITIONAL HOSTS

Synchytrium on *Acalypha virginica* has been collected at Lone Rock, Arena, and Prairie du Sac. Only resting sori were present which resemble those of *S. cellulare* Davis. The sori are first whitish, then pale yellow, then reddish brown as the wall develops. The contents are sordid white. Those measured were 80–135 μ in diameter.

Bremia lactucae Regel. On *Lactuca scariola integrata*. Madison.

Peronospora parasitica (Pers.) Tul. On *Cardamine pensylvanica*. Lone Rock.

Sphaerotheca mors-uvae (Schw.) B. & C. On *Ribes lacustre*. White Lake.

Microsphaera alni (Wallr.) Wint. On *Quercus bicolor*. Chippewa Falls.

Erysiphe cichoracearum DC. On *Verbena stricta*. Blue River.

Phyllachora graminis panici Shear. On *Panicum Scribnerianum*. Prairie du Sac.

Darluca filum (Biv.) Cast. On *Uromyces pyriformis* parasitic on *Acorus Calamus*. Arena.

The *Stagonospora* with 7-septate sporules referred to *S. intermixta* (Cke.) Sacc. was collected at Blue River on *Phyllachora* infected leaves of *Cinna latifolia*. The pycnidia are pale and thin walled throughout except the ostiolar ring. The sporules are variable in length the longest one seen being 90x4 μ .

Stagonospora albescens Davis. On *Carex vesicaria*. Arena. In this collection about 2 dm. of the apical portion of the leaves is dead and white with a ferruginous margin at the base. The sporules are 43–57x7–10 μ , 6-septate. With pycnidia of a *Coniothyrium* with elliptical to ovate fuscous sporules 7–10x3 $\frac{1}{2}$ –4 μ .

Septoria graminum Desm. On *Poa pratensis*. Madison (Geo. F. Weber).

Septoria bromi Sacc. var. *elymina* n. var. ad interim. On large indefinite areas that are first yellowish then brown with the death of the tissues; pycnidia scattered, globose or somewhat flattened,

dark walled, innate, $70\text{--}100\mu$ in diameter; sporules straight or slightly curved, acute, continuous, $30\text{--}45\times 1\frac{1}{2}\text{--}2\mu$. On leaves of *Elymus virginicus*, Arena, Wisconsin, July 13, 1922.

Septoria glumarum Pass. On *Secale cereale*. Madison (G. F. Weber). It is said that this is not distinct from *Septoria nodorum* Berk.

Septoria atropurpurea Pk. On *Aster lateriflorus*. Arena and Blue River. Of the latter collection it was noted: "On the thin leaves of this species the spots are more or less angular and without a colored margin."

Entomosporium thuemenii (Cke.) Sacc. On "Paul's English Double Hawthorn". Racine (Mrs. W. H. Crosby). Reported as serious in its effects on the host.

Gloeosporium ribis (Lib.) Mont. & Desm. On *Ribes lacustre*. White Lake.

Monilia cinerea Bon. On fruit of *Pyrus melanocarpa*. Arena.

Ramularia uredinis (Voss) Sacc. With Darluca parasitic on *Melampsora bigelowii* on *Salix nigra*. Edgerton.

Ramularia occidentalis Ell. & Kell. has been collected at Chetek on a leaf of *Rumex verticillatus* that bears also the species that has been referred to *R. pratensis* Sacc.

Ramularia repens Ell. & Evht. On *Aralia racemosa*. Wyoming.

Ramularia asteris (Phil. & Plowr.) Bubak on *Aster azureus*. White Lake.

***Tuberculina argillacea* n. sp.**

Sporodochia epiphyllous on definite orbicular spots which sometimes become confluent and irregular, especially near the leaf margins, numerous, more or less prominent, mostly $50\text{--}100\mu$ in diameter; conidia hyaline, oblong, $8\text{--}16\times 2\frac{1}{2}\text{--}4\mu$.

On Caeoma-infected leaves of *Rubus allegheniensis* or allied species. Madison and Blue Mounds. On *Rubus occidentalis* (cult.) Madison, Wisconsin. May and June. This was abundant at Madison in 1921, apparently parasitic on the Caeoma. The masses of conidia are argillaceous to whitish or, when fresh, honey colored.

Cercospora caricina Ell. & Dearn. On *Carex lupulina*. Blue River. In this collection the slender conidia range up to 120μ in length.

Cercospora nasturtii Pass. On *Radicula sylvestris*. Edgerton. In this collection from Lake Koshkonong the spots are mostly small (about 1 mm.) round, white and arid.

On withered leaves of *Radicula palustris*. Blue River.

Cercospora zebrina Pass. On *Trifolium dubium*. Mazomanie. The publication of this name seems to antedate that of *C. helvola* Sacc.

Cercospora granuliformis Ell. & Hol. On *Viola sagittata*. Arena.

Cercospora clavata (Ger.) Pk. On *Asclepias Meadii*. Arena.

Coleosporium campanulae (Pers.) Lev. Uredinia on *Campanula aparinoides*. Blue River. Confined to a single restricted station where it was abundant and destructive. The uredospores are but 17-22 μ long.

Puccinia graminis Pers.

Uredinia on *Cinna arundinacea*. Saxon. Telia on *C. arundinacea*, Wonewoc. On *C. latifolia*, Madison and Cadott.

Puccinia pruni-spinosae Pers. Telia on *Prunus nigra*. Cadott.

An Aecidium on *Linaria canadensis* has been known in Wisconsin for a dozen years or more. Because of the relationship of the host and the resemblance to the Aecidium on *Pentstemon* it has been suspected that it is connected with *Puccinia andropogi* Schw. but the connection has not been demonstrated and no record has been made for this reason. It occurs along the Wisconsin River from above Mazomanie to Lone Rock and probably further.

Urocystis agropyri (Preuss) Schroet. On *Agrostis alba*. Madison. (W. H. Davis)

Entyloma compositarum Farl. On *Boltonia asteroides*. Richland County opposite Museoda and at Blue River.

Doassansia sagittariae (West.) Fisch. On *Lophotocarpus calcynus*. Blue River. The parasite was not found on *Sagittaria* in this locality. In the irregularity of the spore balls this resembles

the forma *confluens* that occurs on *Sagittaria heterophylla*. Evidently the smut does not recognize *Lophotocarpus* as being generically distinct from *Sagittaria*.

Sclerotium (?) globuliferum Davis. On *Glyceria grandis*. Chetek.

ADDITIONAL SPECIES

In 1921 *Plasmopara cubensis* (B. & C.) Humphrey was collected in gardens at Madison on *Cucumis sativa*, *Cucurbita maxima* and *Cucurbita pepo* in September.

Peronospora myosotidis DBy. A very scanty collection on upper leaves of *Myosotis laxa* in July at Arena is supposed to be of this species but the material was not sufficient for proper examination.

Pleosphaerulina briosiana Pollacci. On *Medicago sativa* (cult.) Madison. (F. R. Jones)

Phyllosticta oakesiae Dearn. & House. On *Oakesia sessilifolia*. White Lake. In "Notes" VIII, p. 418 a collection of this was referred to *Phyllosticta cruenta* (Fr.) Kickx. As this occurs in Wisconsin the development is usually imperfect and I suspect it of being a state of *Diplodia uvulariae* Davis.

Phyllosticta ludwigiae Pk. On *Ludwigia polycarpa*. Blue River. In this collection the spots are usually elongate and the pycnidia prominent and often defective.

Phyllosticta verbenicola Martin. On *Verbena stricta*. Blue River. I have not seen an authentic specimen of this species and Dr. Seaver informs me that there is none in the Ellis herbarium. In this collection the spots are mostly somewhat larger than the description indicates and somewhat cinereous in color, the sporules $6-8 \times 2-3 \mu$.

Phyllosticta ambrosiae n. sp.

Spots brown, suborbicular, immarginate, 3-12 mm. in diameter, mottled with small white arid areas on which the usually solitary pycnidia are located; pycnidia epiphyllous, dark brown, ostiolate, globose and about 100μ in diameter to oval and 150μ long; sporules hyaline, bacilliform, $3-6 \times 1 \mu$. On *Ambrosia trifida*. Gays Mills, Wisconsin, July 30, 1921.

Sclerotiopsis concava (Desm.) Shear & Dodge. On *Fragaria virginiana*. Madison. *Steironema ciliatum*. Blue River. In the latter collection with the conidial form *Hainesia lythri* (Desm.) Hoehn. Connected with *Pezizella lythri* (Desm.) by Shear & Dodge. (*Mycologia* 13: 135 et seq.)

Stagonospora sparganii (Fekl.) Sacc. In leaves of *Sparganium eurycarpum*. Spring Green.

In the provisional list *Panicum depauperatum* was given as a host of *Septoria graminum* Desm. In this specimen the pycnidia are on indefinite pale leaf areas; they are black, globose to elliptical and lenticular, $100-150\mu$ in diameter with firm walls composed of very small cells; the sporules are usually curved, sometimes very strongly so, $50-70 \times 1-1\frac{1}{2}\mu$. I am now referring this to the South American *Septoria tandilensis* Speg. In his description the author notes resemblance to *Puccinia coronata*. The Wisconsin specimen came to me labeled *Puccinia emaculata*. The immersed pycnidia are sometimes laterally compressed.

***Septoria cenchrina* n. sp.**

Spots linear, cinereous, variable in size, often confluent; pycnidia amphigenous, brown-black, globose to depressed-globose to elliptical with a thick wall which is often defective distally, $60-115\mu$ in diameter; sporules filiform, continuous or indistinctly septate, straight or more or less strongly curved, hyaline, $30-100 \times 1\frac{1}{2}-3\mu$. On leaves of *Cenchrus carolinianus*. Spring Green, Wisconsin, July 19, 1921. The longer sporules grow out through the widely open mouth of the pycnidium after the manner of those of *Cylindrosporium* and the species approaches that genus but the *Septoria* condition seems to be the normal state.

Septoria didyma Fekl. What is perhaps a short-spored form of this species is characterized as follows: Spots circular or subcircular, brown with a raised purple border, becoming arid, about 1 mm. in diameter; pycnidia few, pale, globose, epiphyllous, subepidermal, inconspicuous, $50-70\mu$ in diameter; sporules hyaline, oblong, usually curved, uniseptate, $14-27 \times 3\mu$. On leaves of *Salix longifolia*. Lone Rock.

Septoria aparines Ell. & Evht. On *Galium asprellum*. Prairie du Sac. In the collection that I am recording under this name the pycnidia are scattered over the lower surface of the leaf

or sometimes confined to a lateral half. The leaf or half leaf becomes pale yellow and finally dead and brown. The pycnidia are somewhat flattened, about $100 \times 75\mu$ and extend through to the epidermis of the upper leaf surface. There are no pycnidia on the stems. The sporules are continuous, slightly curved, acute, $30-60 \times 1\frac{1}{2}\mu$. I have labeled this forma *asprelli*.

Septoria erechtitis Ell. & Evht. On *Erechtites hieracifolia*. Blue River.

Of a collection on *Salix lucida* the following notes were made: Spots angular to orbicular, olivaceous to brown, becoming cinereous with a dark border, paler below, 1-3 mm. in diameter; acervuli mostly hypophyllous, small, scattered, subcuticular; sporules minute, hyaline, $1-3 \times 1-1\frac{1}{2}\mu$ abstricted from hyaline, vertical, parallel hyphae, $15-20 \times 1\mu$. Cadott, Wisconsin, September 19, 1922. This seems to be a microconidial state but for the purpose of filing I have labeled it ***Gloeosporium egenum* n. sp.**

Colletotrichum pisi Pat. On *Pisum sativum* (cult.) Marshall. (F. R. Jones)

***Colletotrichum violarum* n. sp.** = *C. violae*. *rotundifoliae* (Sacc.)

Spots circular to angular or irregular in outline, arid with a slightly raised margin, 1-6 mm. in diameter, sometimes confluent, often lacerate; acervuli amphigenous, small, black; setae marginal, black, variable in size (up to $165 \times 5\mu$) and number, acute; sporules hyaline, oblong, somewhat curved or at least inequilateral, acute at each end, continuous, $18-20 \times 3\mu$. On leaves of *Viola scabriuscula*, Spring Green, Wisconsin, July 3, 1922. I have not seen a specimen of the fungus on *Viola rotundifolia* collected by G. W. Clinton and referred to as a variety of *Vermicularia concentrica* P. & C. (*V. peckii* Sacc. nec *V. concentrica* Lev.) by Peck in 29th Report, p. 48.

***Septogloewm subnudum* n. sp.**

Spots suborbicular, reddish brown with an olivaceous border, 2-5 mm. in diameter, becoming confluent; acervuli few, small, inconspicuous, epiphyllous, subcuticular; sporules hyaline, fusoid-oblong, straight, inequilateral or usually curved, $20-40 \times 7-11\mu$, with a septum toward each end. On *Smilax herbacea*, Sauk City, Wisconsin, August 23, 1922. The development of the parasite seems

to be poor in this collection. One sporule was seen having a third septum in the middle.

Ramularia canadensis Ell. & Evht. On *Carex* sp. indet. Edger-ton. In this collection the subulate conidiophores range up to 65μ in length, the conidia are fusiform, acute at each end, $16-23 \times 3\frac{1}{2}-4\mu$. In a collection on an undetermined species of *Carex* made at Madison in 1912 the conidia are oblong, acute, at least at one end, $20-30 \times 4-6\mu$. In both collections the conidia develop a median septum.

***Cladosporium caducum* n. sp.**

Spots hypophyllous, at first pale olivaceous, becoming yellow, finally brown, indeterminate, suborbicular, 1-4 mm. in diameter, when old showing on the upper surface; conidiophores hypophyllous, scattered or exceptionally in twos or very small fascicles, deep brown, ascending to erect, 3-4 septate, sometimes branched, often paler and torulose apically, $50-80 \times 3\frac{1}{2}-4\mu$; conidia acro-pleuro-genous, fuligenous or brown, limoniform, apiculate or acute and narrowly truncate at the extremities, sometimes catenulate and the chains sometimes branched, continuous, $10-15 \times 4-7\mu$. On leaves of *Betula nigra* along the Wisconsin river. The spots are usually multiple, the infected leaves fall and considerable defoliation is sometimes caused. This seems near *Cladosporium* but I have not seen septa in the conidia. They resemble those of *Monilia* in form. Although the parasite is abundant on the bottom lands and its effects conspicuous I have found it difficult to get good specimens as the conidiophores are very inconspicuous and soon fall away. The best specimens were obtained in July.

Cladotrichum leersiae Atk. On *Leersia oryzoides*. Blue River. In this collection oval, pale-avellaneous immarginate spots are produced which are sometimes confluent. The conidia are $13-17\mu$ in length and sometimes germinate without the formation of a septum.

Napicladium arundinaceum (Cda.) Sacc. On *Phragmites communis*. Madison.

***Cercospora crassoides* n. sp.**

Spots orbicular, alutaceous with a broad dark purple border, less distinct on the lanose lower surface of the leaf; conidiophores epiphyllous, sometimes a few on the lower surface, ferruginous, sub-

erect, more or less geniculate, septate, sometimes branched, $60-70 \times 6-7 \mu$; conidia ferruginous, lanceolate, 6-8 septate, tapering into a flagelliform distal portion about as long as the body, $100-165 \times 13-7 \mu$. On leaves of *Froelichia floridana*, Lone Rock, Wisconsin, July 23 and 25, 1921. The spots are sometimes very abundant but mostly sterile. It is not unlikely that vertical septa appear at full maturity and that this therefore is an *Alternaria* like *A. crassa* (Sacc.) Rands (*Cercospora crassa* Sacc.) which it resembles in its conidia.

Cercospora cucurbitae Ell. & Evht. A parasite on leaves of *Cucurbita maxima* (cult.) collected at Madison, I have referred to this species although it is quite different from the type in appearance. In the Wisconsin material the spots are suborbicular, brown, with a distinct darker border above, whitish and immarginate below, 2-5 mm. in diameter, sometimes confluent; conidiophores scattered or in small tufts, amphigenous, fuscous, somewhat curved, sometimes septate, simple, more or less denticulate especially near the apex, $70-130 \times 3-4 \mu$; conidia flagelliform, straight or the slender distal portion curved, septate, hyaline, $87-123 \times 3 \mu$. It was collected in October.

Uromyces perigynius Hals. var. *altiporus* n. var. Uredinia brown, erumpent, elliptical to linear 0.2-1 mm. long; uredospores brown, globose to elliptical, ovate, obovate or oblong, wall brown $1-1\frac{1}{2} \mu$ thick, echinulate, $12-23 \times 12-15 \mu$, germ pores two, variously situated in the upper half of the spore; telia similar but darker; teliospores obovate to subfusoid, brown, rounded or often conical at the apex which is strongly thickened (up to 10μ), pedicel hyaline as long as the spore or longer. On leaves, bracts and perigynia of *Carex Grayii*, Blue River, Wisconsin, August 9, 1922. I am keeping this collection separate because the germ pores are uniformly further from the equator than in *U. perigynius* as I have seen it and as it is described. Often one pore lies higher than the other, sometimes both are subpolar.

Happening to be in a locality in which *Aecidium allenii* Clint. was abundant on *Shepherdia canadensis* attempt was made to get a clue to the alternate stages. The infected Shepherdia was confined to the small valley through which the waters of Fish creek flowed into Green Bay. The first step was to find a host having the same habitat as the Shepherdia and *Carex eburnea* was

hit upon as such a plant. Examination of the old leaves showed that they had borne a rust the previous year. Then began the watching of the *Carex eburnea* plants in the vicinity of infected *Shepherdia* plants. Soon a few uredinia appeared on the culms speedily followed by abundant telia on culms and leaves. The following autumn a trip to the locality was made and abundant telial material on the *Carex* secured and seeds of *Shepherdia* which were kept in a box outdoors during the winter. It was during this winter, while attending a meeting of the American Association for the Advancement of Science that it was learned that *Aecidium allenii* had been connected with a grass rust in Colorado. However the following spring attempts were made to secure plants of *Shepherdia canadensis* but without success. The seed would not germinate and no nursery was found that could supply plants. Some plants of *Shepherdia argentea* were obtained and attempts made to infect them but without success. Plants of *Artemisia dracunculoides* were also exposed to infection without result. Attempts to infect *Shepherdia argentea* using teliospores of *Puccinia coronata* on *Calamagrostis canadensis* also failed. The next autumn another trip to the locality was made and in addition to telial material small plants of *Shepherdia canadensis* were secured which were brought to Madison and heeled in for the winter in what was thought to be a safe situation. On looking for them in the spring it was found that trucks had been running over them during the winter but two of the plants proved to be still alive. These were potted and taken into the greenhouse and one of them used for the infection experiment. The weather was very warm and no spore germination was observed in slide cultures and it was still hotter in the greenhouse. Nevertheless attempts were made to secure infection but without result. Finally in despair, the *Shepherdia* plant was transplanted to the garden and before leaving it the wisp of wet *Carex* leaves that had been suspended over it was drawn across two of the leaves on both surfaces. As it happened it turned quite cold that night and typical *Aecidium allenii* developed on the two leaves that had been smeared and on those leaves only. Again the locality was visited the next autumn and telial material and small plants of *Shepherdia canadensis* obtained and again the following spring telial germination was not secured. Still an attempt to infect in the greenhouse was made which finally resulted in a single but well developed aecidial spot bearing numerous cups. Examining this one day it was thought to be ready for plucking and pre-

serving but as there were a few peripheral cups that were not yet open it was decided to leave it one more day. The next day it was found that some creature with epicurean taste had carefully eaten out each cup except three or four that were not open. The evidence seems to indicate that there is in Wisconsin a rust bearing aecidia on *Shepherdia canadensis* and uredinia and telia on *Carex eburnea*.

***Puccinia caricis-shepherdiae* n. sp.**

Aecia; "Spots large, indefinite, yellowish; peridia hypogenous, elongated, cylindrical, white, nestling among the tomentum of the leaf; spores bright orange. subglobose, 1-1000 in. in diameter." *Aecidium allenii* Clint. in 24th Rept. of the New York State Museum, p. 93. Uredinia few, mostly culmicolous; uredospores elliptical, deep brown, wall $1\frac{1}{2}\times 2\frac{1}{2}\mu$ thick, finely echinulate, germ pores two approximately equatorial, $23-33\times 17-27\mu$. Telia culmicolous and foliicolous, elliptical to linear, rupturing the epidermis, dark brown; teliospores brown, clavate, rounded to rounded-conical at the apex which is strongly thickened (up to 13μ) more or less constricted at the septum, the lower cell narrower and much paler than the upper, $44-63\times 17-23\mu$, pedicel hyaline, the length of the spore or shorter. This seems closely related to *Puccinia pringsheimiana* Kleb. but the uredo and teliospores are somewhat larger and the pedicels of the latter longer and more firmly attached. On *Carex eburnea*, Fish Creek, Wisconsin.

[In 1923 an attempt was made to infect *Shepherdia canadensis* with teliospores from *Carex eburnea* outdoors to see if the infections would not be more abundant than had been secured in the greenhouse. Old leaves of *Carex eburnea* bearing telia were obtained at Fish Creek May 14th. Rusted leaves were placed under and on a plant of *Shepherdia canadensis* in an open plot from time to time. Two leaves bearing aecia were removed June 28th. During my absence after July 3d the plant was watched by Dr. E. A. Baird who removed two leaves bearing aecia July 23d and one July 31st. A plant of *Shepherdia argentea* exposed to infection in the same manner bore no aecia. No infection of this species occurred in the greenhouse in previous years. So far as the evidence goes at present *S. argentea* does not bear this Aecidium.]

In June, 1922 a few uredinia were found on a leaf of *Rumex altissimus* growing beside the railroad at Madison. Later they were found in more abundance along the same railway line at

Arena and in September telia were found also. The rust agreed with the description of *Puccinia punctiformis* Diet. & Hol. and Dr. H. S. Jackson has identified it with that species through comparison with authentic material in the Arthur herbarium. As this had been known only from California, Mexico and Guatemala it was presumably a waif in Wisconsin and perhaps will not be able to maintain itself in this climate.

Galium triflorum as a host of *Puccinia punctata* Lk. should be stricken from the provisional list, the rust that has been collected on that host being *Puccinia troglodytes* Lindr. Collections have been made at Neopit, Athelstane and White Lake.

Puccinia tumidipes Pk. On *Lycium halimifolium* (cult.) Madison (Edward Kremers, com. R. B. Streets).

UNIVERSITY OF WISCONSIN HERBARIUM,
MADISON, WISCONSIN, MARCH, 1923.

INDEX TO "NOTES" IX, X, XI

Names of Fungi in *italics*.

Acalypha virginica, 276, 292	Carex, 298
Acer Negundo, 282	Carex chondorrhiza, 277
Acorus Calamus, 292	Carex eburnea, 257, 301
<i>Aecidium allenii</i> , 299	Carex Grayii, 299
<i>Aecidium dicentrae</i> , 279	Carex grisea, 253
<i>Aecidium fraxini</i> , 259	Carex intumescens, 259
Agropyron tenerum, 259	Carex longirostris, 259
Agrostis alba, 278, 294	Carex lupulina, 294
<i>Albugo bliti</i> , 265	Carex tribuloides, 281
<i>Albugo candida</i> , 265	Carex vesicaria, 292
<i>Albugo portulacae</i> , 265	Carya cordiformis, 253, 261, 283
<i>Albugo tragopogonis</i> , 265	Carya ovata, 253
Allium canadense, 281	Celtis occidentalis, 285
<i>Alnus crispa</i> , 257	Cenchrus carolinianus, 296
Amaranthus hybridus, 265	<i>Cercospora ampelopsisidis</i> , 289
Amaranthus retroflexus, 265	<i>Cercospora antipus</i> , 278
Ambrosia, 289	<i>Cercospora arctostaphyli</i> , 253
Ambrosia psilostachya, 259, 276	<i>Cercospora brunnea</i> , 289
Ambrosia trifida, 254, 295	<i>Cercospora caricina</i> , 253, 258, 294
Amelanchier oblongifolia, 288	<i>Cercospora clavata</i> , 294
Amelanchier spicata, 288	<i>Cercospora crassoides</i> , 298
Anemone canadensis, 271	<i>Cercospora cucurbitae</i> , 299
Anemone quinquefolia, 268, 271	<i>Cercospora davisi</i> , 275
Anemone virginiana, 259, 283	<i>Cercospora diffusa</i> , 278
<i>Apocynum androsaemifolium</i> , 277	<i>Cercospora epigaeae</i> , 275
Aralia racemosa, 293	<i>Cercospora epigaeina</i> , 275
Artemisia ludoviciana, 259	<i>Cercospora euonymi</i> , 262
Artemisia serrata, 256	<i>Cercospora flagellifera</i> , 258
Asclepias Meadii, 294	<i>Cercospora fraxini</i> , 291
<i>Ascochyta lophanthi lycopina</i> , 277	<i>Cercospora galii</i> , 289
<i>Ascochyta necans</i> , 274	<i>Cercospora granuliformis</i> , 294
<i>Ascochyta pisii</i> , 277	<i>Cercospora helvola</i> , 294
<i>Ascochyta pteridis</i> , 273, 274	<i>Cercospora medicaginis</i> , 278
<i>Ascochyta salicifoliae</i> , 288	<i>Cercospora mississippiensis</i> , 274
Aster azureus, 293	<i>Cercospora molluginis</i> , 285
Aster lateriflorus, 257, 276, 277, 280, 281, 293	<i>Cercospora moricola</i> , 261
Aster paniculatus, 259, 277	<i>Cercospora nasturtii</i> , 294
Aster sagittifolius, 283	<i>Cercospora oxybaphi</i> , 258
Aster Tradescantii, 256, 257, 277	<i>Cercospora platyspora</i> , 275
<i>Asteroma gentianae</i> , 273	<i>Cercospora prenanthiae</i> , 289
<i>Asteromella astericola</i> , 281	<i>Cercospora racemosa</i> , 289
Baptisia bracteata, 258	<i>Cercospora ratibidae</i> , 286
<i>Basidiophora entospora</i> , 256, 269, 276	<i>Cercospora rudbeckiae</i> , 289
Betula nigra, 276, 298	<i>Cercospora saniculae</i> , 275
Bidens vulgata puberula, 278	<i>Cercospora sii</i> , 275
<i>Bifusella lineare</i> , 252	<i>Cercospora smilacina</i> , 275
Boehmeria cylindrica, 287	<i>Cercospora smilacis</i> , 274-275
Boltonia asteroides, 294	<i>Cercospora stomatica</i> , 258, 275
<i>Botrytis epichloae</i> , 261	<i>Cercospora tabacina</i> , 289
<i>Bremia lactucae</i> , 256, 265, 292	<i>Cercospora teucrii</i> , 262
<i>Caecilia atriplicifolia</i> , 288	<i>Cercospora velutina</i> , 258
<i>Caecilia reniformis</i> , 288	<i>Cercospora verbenaes-strictas</i> , 286
Campanula aparinoides, 294	<i>Cercospora viciae</i> , 258
Cardamine pennsylvanica, 292	<i>Cercospora zebrina</i> , 294
	<i>Cercosporaella apocyni</i> , 253

Cercospora cana, 257, 274
Cercospora celtidis, 285
Cercospora mirabilis, 274
Cercospora pyrina, 257
Cercospora reticulata, 261
Cerotelium urticastri, 279
Chenopodium album, 252, 267
Cicuta bulbifera, 277
Cicuta maculata, 252
Cinna arundinacea, 294
Cinna latifolia, 292, 294
Cirsium discolor, 256
Cirsium muticum, 266
Cladochytrium maculare, 265
Cladosporium astericola, 285
Cladosporium caducum, 298
Cladosporium carpophilum, 261
Cladosporium simplex, 285
Cladosporium subsessile, 253, 257
Cladosporium triosteum, 257
Cladotrichum leersiae, 298
Claviceps nigricans, 280
Clintonia borealis, 263
Coleosporium campanulae, 294
Colletotrichum graminicolum, 257
Colletotrichum pisii, 297
Colletotrichum violarum, 297
Convolvulus spithameus, 261
Cordyceps clavulata, 260
Crataegus Oxyacantha, 293
Cryptomyces pteridis, 273
Cucumis sativa, 260, 295
Cucurbita maxima, 295, 299
Cucurbita Pepo, 295
Cylindrosporium apocyni, 253
Cylindrosporium caryogenum, 283
Cylindrosporium clematidis, 253
Cylindrosporium fraxini, 290, 291
Cylindrosporium guttatum, 283
Cylindrosporium salicifoliae, 288
Cylindrosporium toxicodendri, 283
Cylindrosporium vermiciforme, 257
Cyperus Schweinitzii, 258
Dactylis glomerata, 278
Darluca filum, 277, 292
Depazea gentianaecola, 272, 273
Desmodium canadense, 259, 274
Desmodium illinoense, 274
Didymaria platyospora, 275
Didymellina iridis, 253
Diplodia uvulariae, 295
Doassansia ranunculina, 275
Doassansia sagittariae, 294
Echinocloa crusgalli, 286
Eleocharis palustris, 280
Elymus brachystachys, 276
Elymus virginicus, 293
Entomosporium thuemenii, 293
Entyloma calendulae, 254
Entyloma compositarum, 254, 259, 294

Entyloma linariae gratiolae, 262
Entyloma ranunculi, 278
Eccornartium muscicola, 260
Epichloe typhina, 261
Erechtites hieracifolia, 297
Erigeron annuus, 257, 274
Erysiphe cichoracearum, 276, 292
Eupatorium urticaefolium, 278
Evonymus atropurpureus, 260, 262
Fragaria virginiana, 278, 296
Fraxinus americana, 278
Fraxinus nigra, 257, 259, 260, 289, 290
Fraxinus oregana, 291
Fraxinus pennsylvanica, 257, 260, 279, 285, 289, 290
Froelichia floridana, 299
Fuscladium caryigenum, 261
Fuscladium cerasi, 261
Fuscladium depressum, 275
Fuscladium effusum, 261
Fusidium pteridis, 273
Galium asprellum, 276, 296
Galium triflorum, 302
Gaylussacia baccata, 278, 279
Gentiana Andrewsii, 272
Gentiana puberula, 273
Geranium maculatum, 266
Geum canadense, 256
Geum strictum, 263
Geum virginianum, 263
Gloeosporium aridum, 257
Gloeosporium caryaee, 253
Gloeosporium egenum, 297
Gloeosporium fraxineum, 257
Gloeosporium leptospermum, 273
Gloeosporium necans, 273
Gloeosporium obtogens, 273
Gloeosporium pteridis, 273
Gloeosporium ribis, 293
Gloeosporium salicis, 256-257
Glyceria grandis, 295
Glyceria nervata, 261
Gnomonia ulmea, 256
Gratiola virginiana, 262
Hainesia lythri, 296
Halenia deflexa, 264
Helenium autumnale, 276
Hepatica acutiloba, 271
Heterosporium gracile, 253
Hydrocotyle americana, 255, 264
Hypoderma lineare, 252
Hypoxis hirsuta, 283
Ilex verticillata, 260
Iva xanthifolia, 287
Koeleria cristata, 254, 281
Lactuca Scariola integrata, 256, 292
Lactuca spicata, 266
Laportea canadensis, 279
Lathyrus palustris, 258
Lecanium corni, 260

Leersia oryzoides, 298
Lepachys pinnata, 286
Leptothyrium conspicuum, 272
Leptothyrium gentianaecolum, 272
Lespedeza frutescens, 258
Linaris canadensis, 294
Lonicera Sullivantii, 278
Lophodermium lineare, 252
Lophotocarpus calycinus, 294
Ludwigia polycarpa, 295
Lycium halimifolium, 302
Lycopus americanus, 287
Lycopus uniflorus, 264, 282, 287
Lycopus virginicus, 277
Lysimachia terrestris, 257, 264
Macrophoma arenæ, 281
Marssonina fraxini, 253, 289
Marssonina necans, 273
Marssonina populi, 277
Marssonina potentillæ, 253, 278
Marssonina potentillæ tormentillæ, 257
Marssonina rhabdospora, 257
Marssonina thomasiiana, 260
Medicago lupulina, 278
Medicago sativa, 295
Melampsora americana, 255
Melampsora arctica, 255
Melampsora bigelovii, 293
Melica striata, 256, 257
Melilotus alba, 275, 281
Mentha arvensis canadensis, 289
Microsphaera alni, 292
Mollisia earliana, 253
Mollugo verticillata, 286.
Monilia cinerea, 293
Morus rubra, 261
Mycosphaerella rubi, 272
Myosotis laxa, 295
Napicladium arundinaceum, 298
Oakesia sessilifolia, 295
Oenothera biennis, 268
Oenothera rhombipetala, 277
Oryzopsis asperifolia, 251
Ovularia monosporia, 289
Ovularia obliqua, 289
Oxybaphus hirsutus, 258
Panicum depauperatum, 296
Panicum Scriberianum, 292
Panicum virgatum, 276
Parietaria pensylvanica, 280
Pedicularis canadensis, 264
Peronospora alsinearum, 267
Peronospora alta, 268
Peronospora arthuri, 268
Peronospora calotheca, 268, 276
Peronospora chamaesyces, 268
Peronospora corydalis, 267
Peronospora effusa, 267
Peronospora ficariae, 267, 276
Peronospora florkeae, 268
Peronospora leptosperma, 256, 268
Peronospora myosotidis, 295
Peronospora obovata, 267
Peronospora parasitica, 268, 292
Peronospora polygoni, 267
Peronospora potentillæ, 268
Peronospora rubi, 256, 268
Peronospora schleideni, 267
Peronospora silenes, 267
Peronospora trifoliorum, 268
Peronospora urticae, 267
Petasites palmatus, 264
Pezizella lythri, 296
Phacidium taxi, 280
Phleospora anemones, 283
Phleospora oxyacanthae, 274
Phleospora salicifoliae, 288
Phleospora ulmi, 256, 277
Phoma alticola, 281
Phragmites communis, 298
Phyllachora ambrosiae, 276
Phyllachora graminis, 276
Phyllachora graminis panici, 276, 292
Phyllachora melicae, 256
Phyllachora oryzopsis, 251
Phyllactinia corylea, 276
Phyllosticta ambrosiae, 295
Phyllosticta apocyni, 277
Phyllosticta atriplicis, 252
Phyllosticta congesta, 280
Phyllosticta cruenta, 295
Phyllosticta destruens, 288
Phyllosticta dioscoreae, 260
Phyllosticta fraxinicola, 260
Phyllosticta grossulariae, 256
Phyllosticta innumerabilis, 288
Phyllosticta ludwigiae, 295
Phyllosticta melaleuca, 288
Phyllosticta oakesiae, 295
Phyllosticta phaseolina, 260
Phyllosticta phomiformis, 256
Phyllosticta pyrolae, 281
Phyllosticta quercæ, 284
Phyllosticta steironematis, 281
Phyllosticta ulmicola, 288
Phyllosticta verbascicola, 281
Phyllosticta verbenicola, 295
Phyllosticta virginiana, 288
Physalis heterophylla, 278
Physalospora ambrosiae, 276
Physocarpus opulifolius, 251
Physoderma vagans, 265
Phytophthora infestans, 266
Phytophthora thalictri, 266
Piggotia vaccinii, 272
Pisum sativum, 297
Plasmopara acalyphae, 251, 266
Plasmopara australis, 267

Plasmopara cephalophora, 267
Plasmopara cubensis, 260, 295
Plasmopara geranii, 266
Plasmopara halstedii, 267
Plasmopara humuli, 266
Plasmopara illinoensis, 280
Plasmopara kellermani, 287
Plasmopara obducens, 251, 266
Plasmopara pygmaea, 266, 271
Plasmopara ribicola, 266
Plasmopara viburni, 267
Plasmopara viticola, 267
Pleosphaerulina briosiana, 295
Poa annua, 277, 279
Poa pratensis, 278, 292
Polygonum Persicaria, 279
Populus balsamifera, 277
Populus grandidentata, 257
Populus tremuloides, 253, 257
Potentilla anserina, 278
Premianthes, 289
Prenanthes alba, 264, 289
Protomyces andinus, 269
Prunus americana, 261
Prunus nigra, 294
Prunus pennsylvanica, 280
Prunus virginiana, 288
Pseuderata, 252
Pseudopeziza singularia, 276
Puccinia absinthii, 259
Puccinia agropyri, 259
Puccinia aletridis, 291
Puccinia andropogonis, 254
Puccinia anemones-virginianae, 259
Puccinia asteris, 277
Puccinia atropuncta, 275
Puccinia caricis-shepherdiae, 301
Puccinia cryptoaeniae, 289
Puccinia gigantispora, 259
Puccinia graminis, 259, 279, 294
Puccinia koeleriae, 254
Puccinia koeleriae-liatris, 254
Puccinia liatris, 254
Puccinia magnusiana, 254
Puccinia peridermiospora, 259, 279
Puccinia polygoni-amphibii, 279
Puccinia pruni-spinosae, 294
Puccinia punctiformis, 302
Puccinia pustulata, 254
Puccinia simillima, 254
Puccinia troodioides, 302
Puccinia tumidipes, 302
Puccinia zygadeni, 275
Pucciniastrum arcticum americanum, 254, 255
Pucciniastrum myrtilli, 279
Pyrola elliptica, 281
Pyrus ioensis, 257
Pyrus melanocarpa, 293
Quercus bicolor, 256, 284, 292
Radicula palustris, 294
Radicula sylvestris, 294
Ramularia asteris, 257, 293
Ramularia canadensis, 298
Ramularia celtidis, 285
Ramularia desmodii, 274
Ramularia dispar, 278
Ramularia effusa, 278
Ramularia fraxinea, 278
Ramularia lysimachiae, 257
Ramularia occidentalis, 293
Ramularia pratensis, 293
Ramularia repens, 289, 293
Ramularia tanaceti, 285
Ramularia tenuis, 261
Ramularia uredinis, 278, 293
Ramularia variata, 289
Ramularia virgaureae, 257, 258, 259, 278
Ranunculus recurvatus, 276, 279, 280
Ranunculus septentrionalis, 276, 277, 279, 280
Rhus Toxicodendron, 283
Rhytiisma lineare, 252
Ribes lacustre, 292, 293
Ribes oxyacanthoides, 256
Ribes prostratum, 266
Ribes triste, 266
Rubus allegheniensis, 251, 256, 282, 293
Rubus canadensis, 257
Rubus hispida, 257, 264
Rubus idaeus aculeatissimus, 254
Rubus occidentalis, 254, 255, 293
Rubus triflorus, 254, 255, 268
Rubus villosus, 264
Rudbeckia, 289
Rudbeckia laciniata, 264
Rumex altissimus, 301
Rumex verticillatus, 293
Salix alba vitellina, 256
Salix amygdaloidea, 278
Salix longifolia, 296
Salix lucida, 257, 277, 297
Salix nigra, 293
Schizonella melanogramma, 259
Scirpus atrovirens, 263, 272
Sclerosporella graminicola, 269
Sclerotiopsis concava, 296
Sclerotium deciduum, 259
Sclerotium globuliferum, 295
Scoleotrichum graminis, 278
Scrophularia leporella, 256
Secale cereale, 293
Septocylindrium caricinum, 253
Septocylindrium concomitans, 278
Septogloea ampelopsis, 252
Septogloea convolvuli, 261
Septogloea querceum, 283
Septogloea subnudum, 297
Septoria acerella, 282
Septoria ampelopsis, 252

Septoria angularis, 283
Septoria annua, 277
Septoria aparines, 296
Septoria aquilegiae, 252
Septoria atriplicis, 252
Septoria atropurpurea, 277, 293
Septoria besseyi, 289
Septoria bromi elymina, 292
Septoria cacaliae, 288
Septoria caricinella, 277
Septoria cenchrina, 296
Septoria chenopodii, 252
Septoria comitata, 282
Septoria commonsii, 256
Septoria didyma, 296
Septoria erichthii, 297
Septoria fumosa, 283
Septoria gei, 256
Septoria glumarum, 293
Septoria graminum, 292, 296
Septoria irregularis, 283
Septoria lycopi, 282
Septoria negundinis, 282
Septoria noctiflorae, 256
Septoria nodorum, 293
Septoria oenotherae, 277
Septoria polaris, 277
Septoria populi, 257
Septoria rubi, 272, 282
Septoria salicifoliae, 288
Septoria scrophulariae, 256
Septoria sii, 277
Septoria solidaginicola, 277, 283
Septoria stachydis, 256
Septoria tandemensis, 296
Septoria umbelliferarum, 253
Shepherdia argentea, 301
Shepherdia canadensis, 299, 301
Silene nivea, 256
Smilax herbacea, 297
Solidago latifolia, 261, 283
Solidago nemoralis, 257
Solidago patula, 277
Solidago serotina, 258, 278, 285
Sparganium eurycarpum, 296
Sphaeria gentianaecola, 273
Sphaerotheca humuli, 251
Sphaerotheca mors-uvae, 292
Spiraea salicifolia, 288
Stachys palustris, 256
Stagonospora albescens, 281, 292
Stagonospora atriplicis, 252
Stagonospora intermixta, 292
Stagonospora meliloti, 282

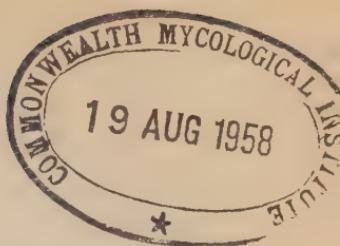
Stagonospora sparganii, 296
Steironema ciliatum, 281, 296
Stipa spartea, 262
Strophostyles helvola, 260, 279
Synchytrium anemones, 264
Synchytrium asari, 264
Synchytrium aureum, 255, 263, 276
Synchytrium cellulare, 262, 287
Synchytrium cinnamomeum, 280
Synchytrium decipiens, 264
Synchytrium globosum, 263
Synchytrium nigrescens, 280
Synchytrium pulvereum, 264
Synchytrium scirpi, 263, 272
Taenidia integriflora, 275
Tanacetum vulgare, 285
Taxus canadensis, 280
Teucrium canadense, 262
Thalictrum dasycarpum, 266, 278
Thalictrum revolutum, 266
Trifolium dubium, 294
Triosteum aurantiacum, 257
Tuberculina argillacea, 293
Typhula muscicola, 260
Ulmus americana, 288
Ulmus fulva, 256, 277
Ulmus racemosa, 256, 288
Urocystis agropyri, 278, 294
Uromyces appendiculatus, 279
Uromyces graminicola, 254
Uromyces hedyosari-paniculati, 259
Uromyces minutus, 259
Uromyces perigynius altiporus, 299
Uromyces pyriformis, 292
Urophlyctis major, 265
Urophlyctis plurianulata, 265
Ustilago hypodytes, 262
Ustilago sphaerogena, 286
Ustilago striiformis, 278
Venturia cerasi, 261
Verbascum Thapsus, 281
Verbena stricta, 286, 292, 295
Vernonia fasciculata, 276
Vicia americana, 268
Vicia angustifolia segetalis, 277
Viola conspersa, 264
Viola pallens, 264
Viola pubescens, 264
Viola sagittata, 294
Viola scabriuscula, 297
Vitis bicolor, 288
Vitis vulpina, 288
Zizia aurea, 265

NOTES ON PARASITIC FUNGI IN
WISCONSIN, XII, XIII, XIV

BY J. J. DAVIS

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XXII

Issued July, 1926.



NOTES ON PARASITIC FUNGI IN WISCONSIN—XII

J. J. DAVIS

In "Notes" V, p. 63, *Artemisia ludoviciana* was given as a host of *Plasmopara halstedii* (Farl.) Berl. & De Toni. This was an error as the mildew in the collection is *Peronospora leptosperma* DBy. It has also been collected on a host referred to *Artemisia serrata* at Jump River and Caryville.

The *Peronospora* on *Cerastium nutans* recorded in the provisional list under the name *P. alsinearum* Casp. is referred to *P. tomentosa* Fckl. by Gaeumann (*Beitr. z. Krypt. fl. d. Schweiz* 54:61) with the statement that it is biologically distinct. As far as observed it is confined to the single species of host in Wisconsin.

For the ascigerous species having *Fusicladium* as the conidio-phorous stage the genus *Endostigme* has been proposed by H. Sydow (*Ann. Mycol.* 21: 173).

The reference of *Montagnella heliopsisidis* (Schw.) Sacc. to *Rosenscheldia* by Theissen & Sydow (*Ann. Mycol.* 13: 649. *taf. IV, fig. 7*) was probably based on examination of immature material. When fully developed the stromata containing the locules are approximately spherical as stated by Ellis & Everhart (*North American Pyronomycetes*, p. 252). Collections of this parasite are usually sterile as stated by Trelease in the Preliminary List or immature. In material on *Aster Tradescanti* collected at Blue River September 15 some of the locules contain uniseptate spores about 20–24 x 4 μ , but asci were not seen.

In "Notes" VII, p. 208 it was stated that traces of *Taphrina ulmi* (Fckl.) Johans. had been seen in Wisconsin. It was collected in 1923 on *Ulmus americana* at Avoca and in more abundance at Edgerton and scantily developed at Wyeville. This has since been found at Avoca and Madison.

All specimens of *Septoria* on *Polygonum* that have been collected in Wisconsin have been referred to *S. polygonorum* Desm. They agree better with the description given by Dr. Martin in "Enumeration and Description of the Septorias of

North America" (*Journ. Mycol.* 3: 68) than with those of European authors. The sporules vary from 23-63 x 1-2 μ and the colored border of the spots is purple, brown or nearly or quite absent. The accompaniment of the *Septoria* on *Polygonum cilinode* by the mucedine referred to in "Notes" VIII, pp. 415-6 suggests that it may be distinct.

A *Septoria* on *Diervilla* was recorded under the name *S. diervillicola* Ell. & Evht. in the provisional list. Both Ellis and Everhart and Peck had described it as a new species giving the binomial *Septoria diervillae*. Saccardo preserved *S. diervillae* Pk. and changed *S. diervillae* E. & E. to *S. diervilicola* (*Syl. Fung.* 10: 356) evidently taking Peck's publication to be the prior one. In the *Journal of Mycology* 3: 51, Dr. Martin stated that Peck's 38th Report, in which the publication was made, was not issued until 1886 although it is dated Dec. 31, 1884, while Ellis & Everhart published their description in 1885. It appears therefore that *Septoria diervillae* E. & E. is the proper designation as used by Dr. Martin in *Septorias of North America*.

In "Notes" III, p. 254, it was stated that *Quercus alba* should be eliminated from the provisional list as a host of *Leptothyrium dryinum* Sacc. In July 1923, however, the parasite was collected on that species of host at Caryville. In this collection the pycnidia are borne on suborbicular greyish spots having a reddish brown border, 2-5 mm. in diameter which resemble those caused by *Phyllosticta phomiformis* Sacc. The clypei are epiphyllous 60-100 μ in diameter, the sporules elliptical to ovate, brown tinted, 12-17 x 7-10 μ . The small spots and the small pycnidia would deter one from referring this to *L. maculicolum* Wint. with which the size of the sporules would seem to ally it.

Piggotia fraxini B. & C. is referred to *Asteromella* by Petrak in *Annales Mycologici* 21: 269.

In the provisional list *Steironema ciliatum* was given as a host of *Ramularia lysimachiae* Thuem. with question. There is much difference in the appearance of *Ramularia* on this host. Early in the season on young leaves the infected area is not delimited but spreads over a large portion or all of the leaf which dies. Later in the season on mature leaves there is definite spotting. In a specimen collected at Madison in September the tufts are

epiphyllous with black tubercular bases. In all of the specimens the conidiophores and conidia are like those on *Lysimachia*.

A collection of *Cercospora sedoides* E. & E. on *Penthorum sedoides* made at Blue River in September shows conidiophores sometimes densely fasciculate, tortuous, occasionally branched, up to 50μ long. The well developed conidia are $80-90\mu$ long, 7-septate.

The epiphyllous *Cylindrosporium* referred to in "Notes" VIII, p. 428, as occurring on *Spiraea densiflora* in Idaho was collected in 1923 on *S. salicifolia* at Cornucopia where the hypophyllous form also occurred. In the epiphyllous form the sporules are $40-70 \times 3\mu$. It was referred to *Cylindrosporium salicifoliae* (Trel.) Davis, a species which Petrak has referred to the dubious genus *Phleospora* (*Ann. Mycol.* 20: 210).

The conidiophores of *Piricularia parasitica* E. & E. were described as being simple or bifid. When fully developed however they may be dichotomously branched. Occasionally opposite branches are produced. The character of the conidiophores, the comparatively narrow conidia and the habitat make this an aberrant species. It has been found only on *Elymus* and *Hystrix* in connection with the species of *Phyllachora* that is referred to *Ph. graminis* (Pers.) Fekl.

Of a collection on *Lathyrus venosus* referred to *Cercospora viciae* Ell. & Hol. it was noted "conidiophores up to 50μ , conidia up to 70μ long."

All of the specimens of *Cercospora euonymi* Ellis that I have seen are devoid of color throughout.

All specimens of *Cercospora* on *Vernonia* collected in Wisconsin have been referred to *C. vernoniae* Ell. & Kell. *C. oculata* Ell. & Kell. being considered to be a form of that species.

Because of failure to secure spore germination and the peculiar habitat *Doassansia zizaniae* Davis (*Bot. Gaz.* 26: 353, 1898) was recorded under *Sclerotium* in the provisional list. In *North American Ustilagineae* (*Contributions from the Cryptogamic Laboratory of Harvard University* No. 57) it was placed in the list of excluded species and was omitted from *North American Flora* 7:1. Prof. W. H. Davis informs me that he observed germination in July 1923 of the *Tilletia* type with sporidia $16 \times 4\mu$ of overwintered material sent from Wisconsin. There is an error in the description due to the appearance of sections that were not strictly equatorial. There is but a single

layer of spores under the cortical layer instead of "two or three."

ADDITIONAL HOSTS

Specimens on young seedling plants of *Artemisia biennis* from Herbster are tentatively referred to *Synchytrium aureum* Schroet. They occurred within a few feet of infected Petasites. On the leaves of the latter the galls (epiphyllous) are sometimes flattened in a vertical plane and are sometimes confluent in lines forming ridges. On some leaves of Petasites the scattered galls are nearly black recalling the form on Aster for which the name *Synchytrium nigrescens* was proposed in "Notes" X.

Albugo candida (Pers.) Kuntze.

On *Sisymbrium altissimum*. Edgerton.

Peronospora parasitica (Pres.) Tul.

On *Arabis laevigata*. Wyeville. The binomial, as used here, applies to a congerie of host-adapted races having doubtless a common origin and with but little or no morphological differentiation. There are two hypotheses as to the origin of such a group. According to one it was derived from a generalized form that occurred indiscriminately on the various hosts but which underwent physiological changes adapting it to the particular host upon which it was growing until the generalized ancestral form was lost. According to the other hypothesis variants of parasite and hosts occur and unusual conditions arise allowing passage from one genus or species of host to another and followed by physiological changes that result in adaptation to the new host. Following the first hypothesis the process is now a closed one and no new races will arise, those that fail to survive will not be replaced and the number of races will remain as at present or diminish unless present races are subdivided. The second hypothesis would indicate a continuing process with new races arising from time to time.

Agrimonia gryposepala should have been recorded as a host of *Peronospora potentillae* DBy. which has been collected on that species at Blair, Wild Rose, and Lone Rock.

In "Notes" XI it was stated that what was thought to be *Peronospora myosotidis* DBy. had been seen in very small quantity on *Myosotis laxa*. In 1923 the mildew was collected on

M. virginica at Avoca in sufficient quantity for determination and with oospores in stems and branches.

Phyllachora occurs in Wisconsin on *Cinna latifolia* but no mature material has been collected.

Ascochyta thaspii Ell. & Evht. On *Cicuta maculata*. Haugen. The largest sporule measured was $33 \times 6 \mu$.

Ascochyta compositarum Davis. On *Eupatorium purpureum*. Blue Mounds (Gilbert & Davis). In this collection the spots, which become pale in the center, are apparently formed by confluence of small, dark, angular, intervenular areas some of which are distinct. The pale brown or amber-colored pycnidia are depressed globose, $140-180 \mu$ in the horizontal diameter and the sporules $20-27 \times 5-6 \mu$. Biseptate sporules occur very rarely. The collection was made in October.

Septoria gei Rob. & Desm. On *Geum virginianum*, Wyeville. *G. strictum*, Hixton and Two Rivers. *G. canadense*, Glen Haven. The sporules range up to 50μ long, the pycnidia often imperfectly developed.

Septoria violae West. On *Viola lanceolata*. Avoca. (Gilbert & Davis). The sporules are not well developed in this collection.

Septoria lycopi Pass. A collection on *Lycopus uniflorus* was referred to this species in "Notes" X with the statement that the sporules were about $30 \times 1\frac{1}{2} \mu$. Of a subsequent collection the following notes were made: Spots at first indefinite and olivaceous becoming orbicular and cinereous above with a definite margin and sometimes a purple border; pycnidia amphigenous, globose, ostiole papilliform, $50-80 \mu$ in diameter; sporules straight, continuous, $20-30 \times 1 \mu$. On leaves of *Lycopus americanus*. Blue River, October 29, 1923.

Gloeosporium septorioides Sacc. On *Quercus alba*. Blue Mounds. (Gilbert & Davis). Although a septum was not seen in the sporules this is doubtfully distinct from *Marssonina martini* (S. & E.) Magn. The spots are mostly 4-6 mm. in diameter and the acervuli multiple. The collection was made in October and the development was probably from infection late in the season. The sporules are $12-17 \times 2-2\frac{1}{2} \mu$.

Marssonina potentillae (Desm.) Magn. var. *tormentillae* Trail. On *Potentilla canadensis*, Wyeville. The sporules are $15-20 \times 4-6 \mu$.

Septogloeum salicinum (Pk.) Sacc. On *Salix humilis*. Iron River and Brule.

Ramularia pratensis Sacc. On *Rumex persicariooides*. Madison.

In a collection on *Ranunculus acris* made at Cornucopia and referred to *Ramularia aequivoca* (Ces.) Sacc. the conidiophores are about $20\ \mu$ long, the conidia $27-43 \times 2-2\frac{1}{2}\ \mu$ cylindrical, obtuse, continuous or 3-septate. Of a collection on the same host from Herbster it was noted: Conidiophores $12-17\ \mu$ long, conidia $20-40 \times 2\frac{1}{2}-3\ \mu$, 3-septulate.

Ramularia actaeae Ell. & Hol. On *Actaea rubra neglecta*. Cornucopia.

Ramularia barbareae Pk. On *Barbarea stricta*. Wyeville. The short ($10\ \mu$) conidiophores do not seem to be branched but rather developed in small tufts from a common base. Many of the conidia are somewhat less than $3\ \mu$ in diameter.

Ramularia arvensis Sacc. On *Potentilla canadensis*. Wyeville.

Ramularia asteris (Phil. & Plowr.) Bubak. On *Aster sagittifolius*, Cornucopia. *A. azureus*. White Lake. *A. Trade-santi*, Caryville. *A. paniculatus*, Blue River. The conidiophores and conidia are sometimes more slender (3-4 μ) than the descriptions indicate.

Cercospora zebra Pass. On *Trifolium dubium*. Mazomanie. The publication of this name seems to antedate that of *Cercospora helvola* Sacc.

There occurs sparingly on leaves of *Eupatorium purpureum* a parasite that I have referred to *Cercospora perfoliata* E. & E. although it lacks the brown color of that species.

Entyloma compositarum Farl. On *Rudbeckia laciniata*. Sauk City. (Kuntz & Davis).

Puccinia graminis Pers. Uredo and telia on *Cinna latifolia*. Blue River.

Lycopus uniflorus is the most common host of the aecial stage of *Puccinia angustata* Pk. in Wisconsin.

Puccinia peckii (De Toni) Kell. Aecia on *Oenothera pumila*. Wyeville and Arena.

ADDITIONAL SPECIES

The Report of the Geological Survey of Wisconsin, 1873-9 contains a list of Fungi prepared by A. F. Bundy. In this list *Peronospora nivea* Unger was included but hosts were not given. Nothing further was known of this mildew, now known as *Plasmopara nivea* (Ung.) Schroet., in Wisconsin until 1923 when it was found in small quantity at Haugen on leaves of *Cicuta maculata*. [This occurred on a single leaf at Balsam Lake in 1924.]

Phyllosticta steironematis Dearn. & House. On *Steironema ciliatum*. Blue River. Not well developed in this collection; perhaps because of the dry season.

Phyllosticta lappae Sacc. On *Arctium minus*. Haugen. Some of the specimens that have been referred to *Ph. decidua* E. & K. are much like this.

Of a collection on leaves of *Lactuca canadensis* made at Blue River, September 16, 1923, the following notes were made: Stroma superficial, black, composed of small polygonal fuligenous cells, following the veinlets, anastomosing and becoming confluent on leaf areas 1-5 cm. in diameter which become dead, mostly epiphyllous, sometimes hypophyllous. No spore bodies seen. This has been labeled *Asteroma lactucae* nom. herb. It may be that it is not distinct from *Asteroma atratum* Chev.

Septoria margaritaceae Pk. On *Anaphalis margaritacea*, Iron River. In this collection the prominent pycnidia are up to $200\ \mu$ in diameter, the wall of the distal half more or less imperfect. A collection from Herbster bears well developed pycnidia.

Septoria erechitis Ell. & Evht. On *Erechtites hieracifolia*. Blue River.

Of a collection on lower leaves of *Lepachys pinnata* made during a dry season the following notes were made: Spots circular to elliptical or sometimes oblong, sordid white, definite with a narrow dark border, 1-3 mm. in diameter; pycnidia epiphyllous, sometimes prominent, small ($50-75\ \mu$), black; sporules hyaline, curved, continuous, $30-50 \times 1-1\frac{1}{2}\ \mu$. Avoca, June 19, 1923. Where the spots are numerous the leaf area dies and becomes brown. This is provisionally considered to be a state of *Septoria infuscata* Wint.

Cylindrosporium triostei Kell. & Sw. On *Triosteum perfoliatum*. Haugen. Conidia mostly 35–50 μ long.

Ovularia decipiens Sacc. On *Ranunculus acris*. Bayfield. I have seen no mention of the occurrence of this parasite in America.

Ramularia melampyri Ell. & Dearn. On *Melampyrum lineare*. Cornucopia. In these collections there is little or no deformation or discoloration of the infected leaves. The conidia range up to 30 μ in length.

Cercospora simulata Ell. & Evht. On *Cassia marylandica*. Avoca. (Gilbert & Davis).

Cercospora leptandrae n. sp. Hypophyllous on angular areas limited by the veinlets, 2–3 mm. in diameter which are blackened by the mass of conidiophores, upper leaf surface unaltered; conidiophores scattered or in small tufts, dark brown, more or less flexuose and denticulate, pluriseptate, sometimes branched, 75–135 x 5 μ ; conidia subfuligenous, obclavate, straight or slightly curved, becoming 3–5 septate, 40–60 x 5 μ . On leaves of *Veronica (Leptandra) virginica*, Blue River, Wisconsin, September 14, 1923.

Tilletia corona Scribner. On *Leersia virginica*, *L. oryzoides* and *L. lenticularis*. Blue River.

Uromyces seditus Kern. Telia on *Aristida tuberculosa*. Avoca. (Gilbert & Davis).

Puccinia jussiaeae Speg. Aecia and telia on *Ludwigia polycarpa*. Blue River. In these collections the aecia are in small scattered groups and the telia on stems, branches, petioles, occasionally on midribs, but especially on fruiting calyces.

Puccinia antirrhini Diet. & Hol. This occurs in Wisconsin on *Antirrhinum majus* (cult.).

Aecidium myosotidis Burrill. On *Myosotis virginica*. Dane County opposite Sauk City. (Kuntz & Davis and Welles & Davis.)

A few years ago a concrete road was built through a marsh in a suburb of Madison. In the fall *Ustilago sphaerogena* Burr. and *Puccinia flaccida* B. & Br. appeared on *Echinochloa crusgalli* along the road where, however, they were not found subsequent years. The inference that the road builders had brought their equipment from further south and introduced the parasites

therewith seems a fair one. The further inference that neither the smut or the rust are able to withstand the rigor of Wisconsin winters may be drawn.

HERBARIUM OF THE UNIVERSITY OF WISCONSIN,
MARCH, 1924

NOTES ON PARASITIC FUNGI IN WISCONSIN—XIII

J. J. DAVIS

Petrak considers *Asterina rubicola* E. & E. and *Coccochora rubi* Davis as forms of a single species which he designates *Stigmatea rubicola* (E. & E.) Theiss. (*Ann. Mycol.* 22: 109 *et seq.*). That they are closely related phylogenetically seems clear. As far as observed the dothidial form referred to *Coccochora* occurs on blackberries only, the *Asterina* on raspberries only. To determine their degree of relationship will require inoculation experiment.

Petrak rejects the genus *Didymellina* Hoehn. and refers the ascigerous stage with which *Heterosporium gracile* Sacc. is connected to *Didymella* and refers *Mycosphaerella pinodes* (Berk. & Blox.) Niessel to the same genus. He also suggests that *Mycosphaerella lethalis* Stone should be referred to *Didymella* (*Ann. Mycol.* 22: 17–18).

Wolf refers *Mollisia earliana* Sacc. to *Diplocarpon* which he now places in *Phacidiaeae* (*Journ. Elisha Mitchell Scientific Society*).

Leaves of *Corylus rostrata* bearing immature *Mamiana* were taken at Bruce on which were orbicular light brown to cinereous spots 10–15 mm. in diameter. Each spot bore in its center a *Mamiana* stroma and on the remainder scattered acervuli of *Gloeosporium coryli* (Desm.) Sacc. *Leptothyrium corylinum* Fckl. is reported to be a conidial stage of *Mamiana coryli* Batsch. DeNot. The fungus referred to *Gloeosporium coryli* (Desm.) Sacc. somewhat resembles *Leptothyrium*, the cuticular covering of the acervuli being black and clypeoid. The sporules however are not like those of *L. corylinum* but are similar to those of *L. coryli* Lib. In the description of *Gloeosporium coryli* (Desm.) Sacc. it is stated that the acervuli are on the lower surface of the spots, seldom on the upper. The reverse is the case in Wisconsin.

Phacidium taxi Fr. was recorded in "Notes" X as occurring on *Taxus canadensis* in Wisconsin. The record was based on

immature material in which no spores had formed. Another collection on this host was made at Appolonia in September 1924 but this also is immature. However a few spores were found but they probably were not mature. The following notes were made: Ascomata hypophylloous, biserrate, cinerous when dry, dull black when wet, orbicular, about $\frac{1}{3}$ mm. in diameter with thick black walls and a central stellate opening; hymenium discoid, sometimes extending past the acute sulcus on to the lower surface of the epithecium where however the development of asci is rudimentary; asci crowded, straight, cylindrical, $40-60 \times 4-6 \mu$; spores obliquely uniseriate, hyaline, fusiform, straight, $6-10 \times 2-3 \mu$; paraphyses slender, filiform, lax. Usually all of the leaves on the twig bore the ascomata. Whether or not this is the Friesian species is an open question.

In the classification of the Hypodermataceae proposed by Dearness the shape of the apothecia is ignored and to the genus *Hypodermella*, as amended, is referred *Lophodermium amplum* Davis ("Notes" V, pp. 695-6), which thus becomes *Hypodermella ampla* (Davis) Dearn. (*Mycologia* 16: 152).

Phyllosticta renouana Sacc. & Roum. of the provisional list is *Ph. typhina* Sacc. & Malbr. which is the prior name.

In Notes V, p. 701, record was made of pyrenidia in the loculi of *Phyllachora* on *Elymus* for which the binomial *Cytodiplospora elymina* was proposed with the suggestion that it occurred in the life cycle of *Phyllachora*. Petrak is of the opinion that this bears a parasitic relation to the *Phyllachora* and has proposed for it a new genus, *Davisiella* (*Ann. Mycol.* 22: 133-4). A similar development has been observed two or three times in loculi of *Phyllachora* on *Calamagrostis canadensis* but not in sufficient abundance to secure a specimen. On this host the sporules are about twice the length of those on *Elymus*, $10-20 \mu$.

The genus *Sacidium* is being dropped by mycologists following von Hoehnel. The parasite on leaves of *Betula* described by Peck under the name *Septoria microsperma* and referred to *Sacidium* in "Notes" I, pp. 88-9, is placed in von Hoehnel's proposed genus *Cylindrosporella* by Petrak (*Ann. Mycol.* 22: 42-3).

What is probably a form of *Cercospora varia* Pk. has been found on *Viburnum pubescens* (Lewis, Aug. 1, 1924) in which the conidiophores are hyaline and the conidia slender, tapering,

sometimes exceeding 100μ in length. This would fall in *Cercospora* if taken by itself.

Septoria gratiolae Sacc. & Speg. of the provisional list is the parasite to which Ellis & Martin gave the same name for which Berlese & Voglino substituted *Septoria ellisii*. Although there has been no opportunity for comparison it has been assumed that these are conspecific. The Wisconsin specimens bear sporules $25-50 \times \frac{3}{4}-1\frac{1}{2}\mu$ more or less curved and tapering to the attenuate apex.

Ramularia waldsteiniae Ell. & Davis was collected at Hayward in 1924. In this collection the spots are dark purple above, more or less elongated parallel to the veins and often limited by the veins. On the lower surface the spots are pale brown and less sharply limited.

Ramularia magnusiana (Sacc.) Lindau as it has been seen in Wisconsin on *Trientalis americana* bears conidia that are seldom septate, $10-33 \times 1\frac{1}{2}-3\mu$ the shorter ones fusoid. The conidiophores spring from scattered black tubercles $25-40\mu$ in diameter and are mostly fuligenous tinted, $20-60 \times 2-3\mu$. The spots are usually angular, limited by the veinlets and immarginate, light brown becoming paler in the center. While this departs widely from the type it nevertheless appears to be a variant of that parasite.

Glomerularia corni Pk. was recorded in the provisional list on *Cornus canadensis*, *Lonicera canadensis* and *L. oblongifolia*. *Glomerularia lonicerae* (Pk.) Dearn. & House has been used as a designation of the parasite on Lonicera but no distinguishing characters are given. (*N. Y. State Museum Bulletin: Report of the State Botanist for 1921*, p. 85).

In some notes by von Hoehnel published after his death by Weese (*Centralb. f. Bakt. etc.* **60**) the suggestion is made that the genus *Fusicladium* be restricted to conidial forms of *Venturia* and that the species that have been referred to that genus but which have *Mycosphaerella* (*Carlia*) as their ascigerous state be referred to *Passalora*. *Fusicladium depressum* (B. & Br.) Sacc. on *Angelica* he therefore designated *Passalora depressa* (B. & Br.) Hoehn. and *Cercospora platyspora* Ell. & Hol. on *Taenidia Passalora punctiformis* (Wint.) Hoehn. *Fusicladium punctiforme* Wint. and *Cercospora platyspora* Ell. & Hol. based upon the same parasite, were published in *Hedwigia* number for January

and February 1887 and the *Journal of Mycology* number for February 1887 respectively and it would probably now be impossible to determine which has priority in time of publication. To this species von Hoehnel also referred *Cercospora sii* E. & E. on Sium which is certainly very similar. He further suggested that it might be merely a short-spored form of *Passalora depressa* (B. & Br.) Hoehn. In the same publication *Scolecotrichum graminis* Fekl. is also referred to *Passalora* while *Scolecotrichum maculicola* Ell. & Kell. is referred to *Cladosporium* with the suggestion that it may be *C. phragmitis* Opiz. For the much named *Passalora fasciculata* (C. & E.) Earle the genus *Cercosporidium* Earle (*Muhlenbergia* 1: 16) which had been abandoned by its author (*Torreya* 2: 160), is revived and the binomial *Cercosporidium fasciculatum* (C. & E.) Hoehn. added to its generous nomenclature.

Comparison of American specimens of *Cercospora subsanguinea* E. & E. with European specimens of *Ramularia rubicunda* Bres. indicates that they are conspecific. As stated in "Notes" I, p. 83, the plant is referable to *Ramularia* rather than to *Cercospora*. *Cercospora subsanguinea* E. & E. was published in 1887, *Ramularia rubicunda* Bres. in 1896. If the older specific name is preserved a new binomial is necessary. *Ramularia rubicunda* Bres. is in general use in Europe. All references to the plant in Europe are under that name and all European specimens are so labeled. As it is necessary to change the designation of the species as it occurs in America it seems to me best to adopt the name used in Europe. I have therefore labeled the Wisconsin specimens *Ramularia rubicunda* Bres. This obviates any change in Europe and reduces to synonymy but one name instead of two. This may be taken as an illustration of the fact that rigid adherence to the rule of priority may cause more trouble than it cures.

Gloeosporium equiseti E. & E. was considered by Bubak to be identical with *Septoria detospora* Sacc. and was made the type of new genus becoming *Titaeospora detospora* (Sacc.) Bubak. (*Ann. Mycol.* 14: 345 (1916).

Through the kindness of Dr. House I have had opportunity to examine authentic material of *Vermicularia Violae-rotundifoliae* (Sacc.) House. As a result I conclude that the parasite on *Viola scabriuscula* recorded in "Notes" XI, p. 297, under

the name *Colletotrichum violarum* n. sp. is conspecific therewith. They seem to be referable to *Colletotrichum*.

Colletotrichum salmonicolor O'Gara is united with *Gloeosporium fusarioides* Ell. & Kell. by Dearness who proposes the combination *Colletotrichum fusarioides* (E. & K.) O'Gara (*Mycologia* 16: 169) with the suggestion that it is a conidial state of *Glomerella cingulata* (Stonem.) Sp. & V. Schr. If that proves to be the case of course the combination will fall into synonymy.

With the record of *Cylindrosporium vermiforme* Davis as occurring on *Alnus crispa* in Wisconsin was the statement that the sporules in the collection on that species of host were but about $3\ \mu$ in diameter. Material on *A. crispa* collected at Hayward by Gilbert & Davis has normally developed sporules.

For the microconidial state of *Cylindrosporium betulae* Davis the name *Gloeosporium betulae-papyriferae* Dearness & Overholts has been proposed (*Mycologia* 16: 167).

Entyloma linariae Schroet. var. *gratiolae* Davis was collected in 1923 at Haugen on the same host. In neither of the localities was *Entyloma* found on *Veronica*.

Peridermium coloradense (Diet.) Arth. & Kern was recorded in the 4th supplementary list as occurring on *Picea mariana* in Wisconsin but it was not included in the provisional list. This is now thought to be *Peridermium elatinum* A. & S. the aecial stage of *Melampsorella caryophyllacearum* Schroet, the further stages of which have not been collected in Wisconsin. The aecial stage on *Picea* has been observed at but one station in the state the usual host being *Abies balsamea*.

ADDITIONAL HOSTS

Plasmopara geranii (Pk.) Berl. & De Toni. On *Geranium Bicknellii*. Spooner.

Peronospora sordida B. & Br. On *Scrophularia leporella*. Blue River.

Colletotrichum graminicolum (Ces.) G. W. Wilson. On leaves of *Calamagrostis longifolia*. Port Wing.

Ascochyta pisi Lib. On *Lathyrus palustris*. Madison (Gilbert & Davis).

Rubus triflorus should be added to the hosts of *Septoria rubi* West. in Wisconsin.

Septoria psilostega Ell. & Mart. On *Galium boreale*. Hayward.

Ramularia reticulata Ell. & Evht. recorded in the provisional list as a parasite of *Osmorrhiza Claytoni* occurs on *O. longistylis* as well, as one would expect.

Cercospora nivea Ell. & Barth. On *Solidago uliginosa*. Brule. On *Solidago juncea scaberrima*. Lewis. The collections have been referred to this species in spite of the leaf spotting. The following notes were made from examination of the collection from Brule: Spots angular, white or yellowish white below becoming yellow then reddish brown above, 1-3 mm. in diameter; conidiophores more abundant below, fasciculate, 14-33 x 3 μ ; conidia straight or curved, cylindrical to obclavate-cylindrical, 25-80 x 4 μ mostly 40-65 x 3 μ , becoming septate. On *Solidago juncea* the spots become purple above. On one leaf of *S. uliginosa* the coloring of the spots is reversed. In neither of the collections are the conidia abundant.

Cercospora viciae Ell. & Hol. On *Lathyrus ochroleucus*. Danbury.

Cercospora clavata (Ger.) Pk. On *Asclepias tuberosa*. Lewis.

The leaf parasite on *Carpinus caroliniana* recorded in "Notes" II, p. 106 under the name *Fusarium carpineum* n. sp. was collected on the same host at Balsam Lake in July 1924. The cellular base from which the conidia spring is usually simpler in this collection and many of them do not suggest a sporodochium. The spots are circular, about $\frac{1}{2}$ cm. in diameter, scattered and not nervisequent. The spots are not brown until death of the leaf cells takes place when by confluence irregular brown areas may be formed. The conidia are not uniformly bisepitate but develop 1-4 septa. This was found also, in small quantity, on *Carya cordiformis* growing with infected *Carpinus*.

Puccinia graminis Pers. Uredinia on *Poa annua* collected at Black Earth by McFarland & Davis are referred to this species. The uredospores are 17-24 x 13-17 μ . This appears to be the first collection that has been made on this species of *Poa*.

ADDITIONAL SPECIES

Mamiania fimbriata (Pers.) Ces. & DeNot. On *Carpinus caroliniana*. Danbury and Balsam Lake. The collections were made in September and are not mature.

Sclerotinia geranii Seaver & Horne. On *Geranium maculatum*. Madison.

Phyllosticta negundinis Sacc. & Speg. has been collected at several widely separated localities in Wisconsin. I see no morphological distinction between this and *Ph. minima* (B. & C.) E. & E.

salicicola (Fr.) Sacc. *Salix Lævipes*, Bruce

Septoria flagellifera Ell. & Evht. On *Pisum sativum* (cult.). While this species appears to be common in Europe it has not been previously found in America. This raises the question as to whether it is indigenous or introduced. The clump of willows on which it was abundant were close to a highway but it was found later at Danbury on the same species of willow.

Septoria flagellifera Ell. & Evht. On *Pisum sativum* (cult.). Horicon (M. B. Linford). Apparently a species of northern range. The type was from North Dakota and it occurs in Manitoba.

While collecting at Bruce immature ascomata of *Rhytisma prini* Schw. were observed which appeared to have burst with protrusion of the white content which contrasted strongly with the black cortex. Going a little further ascomata of *Rhytisma salicinum* (Pers.) Fr. were found having the same appearance. On examination however it was found that the appearance was due to acervuli on the "tar spots" which had discharged snow white masses of sporules.

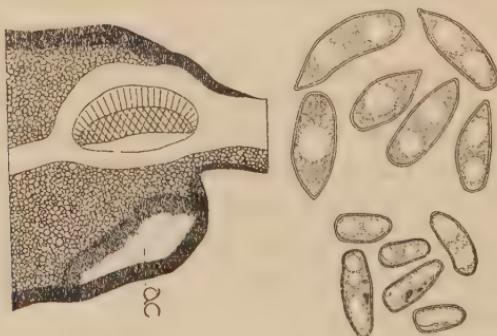
Gloeosporium niveum n. sp. Acervuli under the cortex of the *Rhytisma* stroma, plano-convex, varying in diameter up to $\frac{3}{4}$ mm.; conidia filling the acervulus, apparently produced by abstraction of erect hyphae springing from the base, hyaline, oblong with rounded ends to ovoid, continuous, $7-13 \times 3\mu$. On immature ascomata of *Rhytisma prini* on leaves of *Ilex verticillata*. Bruce, Wisconsin, September 4, 1924.

Acervuli similar to the preceding, conidia oblong to sub-clavate, usually acute at one end, hyaline, continuous, 1-3 guttulate, $13-20 \times 5-6\mu$. On immature ascomata of *Rhytisma salicinum* on leaves of *Salix petiolaris*. Bruce, Wisconsin,

September 4, 1924. The disk of cytoplasm between the guttulae often resembles a septum, especially when stained. This appears to be distinct from *Melasmia salicina* Lev. which Tulasne considered to be a spermogonial state of *Rhytisma salicinum* and which he described and figured in *Carpologia* III, p. 119, tab. XV, fig. 15-17. The question as to whether these collections represent one species or two is left open for the present.

[In 1925 numerous collections were made on various species of *Salix* agreeing with the description given above the conidia being acute at one end suggesting a boat in their shape. No collection was made on *Ilex* in 1925. The appearance of ascomata of *Rhytisma nemopanthis* Pk. sometimes suggested this fungus but this was due to development of *Ramularia nemopanthis* Pk. at the periphery of the ascomata.

The collection on *Salix petiolaris* is taken as the type of the species. I am indebted to President Dearnness for the information that this was issued in *Fungi Columbiani*, 2593 under the name *Tuberculina davisianna* Sacc. & Trav. which belongs to a very different plant.



Gloeosporium niveum n. sp.

Left; Portion of a section of an immature ascoma of *Rhytisma prini* and of an acervulus, ac, from which the conidia have fallen. Upper right; 6 Conidia from *Rhytisma salicinum*. Lower right; 6 Conidia from *Rhytisma prini*.

Drawn with the aid of camera lucida by Lenette M. Rogers.

On leaves of *Betula alba* from Port Wing are large dead areas on the upper surface of which are acervuli bearing fuligenous sporules $9-10 \times 6 \mu$ on hyaline conidiophores. The fungus is probably saprophytic and has been referred to *Melanconium bicolor* Nees.

Cylindrosporium triosteum Kell. & Swingle. On *Triosteum perfoliatum*. Haugen and Bruce. In the collection from Bruce the acervuli are nearly all epiphyllous.

In May and June 1924 collections of a Mucedine on leaves of *Cynoglossum officinale* were made at Madison and Cross Plains. The following notes were made from these collections: Spots dark brown, definite, circular to oval, 5–15 mm. in diameter; conidiophores mostly epiphyllous, fasciculate, hyaline, continuous or septate, 30–60 x about $3\ \mu$; conidia hyaline, cylindrical to fusoid, mostly acute, straight, continuous or sometimes with a more or less distinct median septum, catenulate, 10–30 x $2\frac{1}{2}$ – $3\frac{1}{2}\mu$. This is near *Ramularia cynoglossi* Lindr. from which it differs especially in the slender acute conidia. It appears to be conspecific with the parasite that occurs in Wisconsin on leaves of *Lappula virginiana* which was recorded in "Notes" I, p. 89 under the name *Ovularia asperifolii* Sacc. var. *Lappulae* Davis. It is perhaps better to consider the form that occurs in Wisconsin on *Lappula* and *Cynoglossum* as a species distinct from those that occur in Europe on related Boraginaceae and I have labeled these collections ***Ramularia lappulae* (Davis) n. comb.**

***Ramularia gracilipes* n. sp.** Spots orbicular to subquadangular, dark purple above, lighter below, 5–10 mm. in diameter with a sharply delimited white central portion 1–3 mm. in diameter; conidiophores hypophyllous on the central white portion, fasciculate from a prominent tubercular base, hyaline, slender, usually straight, often septate, sometimes denticulate below the apex, 40–75 x 2–3 μ ; conidia hyaline, straight, cylindrical to fusoid-cylindrical, often more or less acute at one or both ends, frequently with a median septum, 20–40 x $3\frac{1}{2}\ \mu$. On leaves of *Cornus alternifolia*. Bruce, Wisconsin, September 4th, 1924.

***Ramularia artemisiae* n. sp.** Spots brown, of the width of the leaf lobe and 3–5 mm. long the entire lobe usually becoming dead and brown; conidiophores on either surface, densely fasciculate from a more or less prominent light brown base, hyaline, erect or assurgent, lax, 35–80 x $1\frac{1}{2}$ –3 μ ; conidia hyaline, straight, cylindrical to fusoid, usually more or less acute, 0–3 septate, 12–30 x 2–4 μ . On leaves of *Artemisia caudata* or related species. Lewis, Wisconsin, August 2, 1924.

Cercoseptoria minuta n. sp. Spots pale, extending to the mid-rib, immarginate, $\frac{1}{2}$ –2 cm. in length; fasciculi hypophyllous, scattered, penicillate, composed of conidia arising from a small, apparently substomatal, tubercle or plexus, hyaline, straight or somewhat curved, 50 – $60 \times 1 \mu$. On leaves of *Campanula aparinoides*, Wyeville, Wisconsin, July 7, 1923. The generic name is used in the sense suggested in "Notes" VII, p. 401. A very delicate species. Possibly a state of the parasite occurring on this host that develops pycnidia and that was recorded in the provisional list under the name *Septoria campanulue* (Lev.) Sacc.

Because of a prior use of Septoriopsis as a generic name by Fragoso and Paul, Petrak has proposed Cercoseptoria to replace Septoriopsis Stevens & Dalbey. (*Ann. Mycol.* 23: 69).

NOTES ON DISTRIBUTION AND ABUNDANCE. USTILAGINALES

USTILAGO OSMUNDAE Pk. Not frequent or abundant. Collections have been made in 5 localities. Two of them are in the central portion of the state, the others in the northwestern portion where it develops more abundantly.

USTILAGO ZEAE (Beckm.) Unger. Common and often abundant in corn fields.

USTILAGO RABENHORSTIANA Kuehn. This appears to be rare in Wisconsin but may be abundant where it occurs.

USTILAGO SPHAEROGENA Burr. This has been collected at Millville and Madison only, in the southern part of the state. It probably does not maintain itself in Wisconsin but is occasionally introduced.

USTILAGO NEGLECTA Niessl. Usually common and abundant.

USTILAGO STRIAEFORMIS (West.) Niessl. Sometimes abundant in meadows on *Phleum pratense*, less so on *Agrostis alba*. There are two collections on *Poa pratensis*. All are from the southern portion of the state. *Elymus canadensis* was given as a host in the provisional list but I find no specimen on that plant.

USTILAGO CALAMAGROSTIDIS (Fekl.) Clint. But a single specimen collected by A. B. Stout in southern Wisconsin.

USTILAGO AVENAE (Pers.) Jensen.

USTILAGO LEVIS (Kell. & Sw.) Magn. The oat smuts are found more or less abundantly throughout the state.

USTILAGO PERENNANS Rostr. There is but one Wisconsin specimen in the herbaria.

USTILAGO LONGISSIMA (Sow.) Tul. Rather common on *Glyceria grandis* throughout the state.

USTILAGO LONGISSIMA MACROSPORA Davis. The variety occurred abundantly at the type station on *Glyceria septentrionalis* (then known as *G. fluitans*) which was long since destroyed because of the needs of agriculture. It is not known to be present in the state at the present time. It has been collected in Canada by Dearness and is reported to be distributed through central Europe. Bauch has reported interesting differences in the germination of the spores of the variety and of the type. (*Zeitschr. f. Bot.* 15: 241-279 [1923]).

USTILAGO SPERMOPHORA B. & C. This has been seen in the southern part of the state only where it is rare.

USTILAGO MACROSPORA Desm. Reported by Clinton as occurring in Wisconsin but it has not been seen by the writer nor are there Wisconsin specimens at Madison.

USTILAGO TRITICI (Pers.) Rostr.

USTILAGO HORDEI (Pers.) Swingle.

USTILAGO NUDA (Jensen) Kell. & Sw. are more or less common in grain fields in Wisconsin as elsewhere.

USTILAGO LORENTZIANA Thuems. This has been collected at Madison but is rare.

USTILAGO OLIVACEA (De.) Tul. This was collected in 1902 at the outlet of Lost lake in Vilas county which abuts on the northern peninsula of Michigan. It has not been seen in the state since.

USTILAGO UTRICULOSA (Nees) Tul. Not a rare species in Wisconsin and not restricted in range.

USTILAGO OXALIDIS Ell. & Tracy. The collection by Tracy in southwestern Wisconsin is the only one known to have been made in the state.

SPHAEOLOTHECA CRUENTA (Kuehn) Potter. This was collected at Madison by Trelease according to Potter.

SPHAEOLOTHECA SORGHII (Lk.) Clint. This is sometimes abundant in sorghum fields.

SPHAEOLOTHECA HYDROPIPERIS (Schum.) DBy. Not uncommon. Most frequently seen in the northern half of the state.

CINTRACTIA CARICIS (Pers.) Magn. Throughout the state. Like most smuts this varies much in abundance. Some years it is frequently observed and abundant while in other seasons it may not be seen at all.

CINTRACTIA SUBINCLUSA (Koern.) Magn. Observed at but one station which was in southeastern Wisconsin and where it was fairly abundant.

CINTRACTIA JUNCI (Schw.) Trel. Usually abundant where it occurs but in some years it is not seen. The collections are from the southern portion of the state.

SCHIZONELLA MELANOGRAMMA (De.) Schroet. A common and abundant species in southern Wisconsin. There are no specimens from the northern part.

SOROSPORIUM PANICI-MILIACEI (Pers.). Takahashi. This was collected at Madison in 1911 and 1912 and at Baraboo in 1918. It was referred to the following species in the Provisional List.

SOROSPORIUM SYNTHERISMAE (Pk.) Earl. Common and abundant where the host occurs on sandy lands in southern Wisconsin.

TILLETTIA FOETENS (B. & C.) Trel.

TILLETTIA TRITICI (Bjerk.) Wint.

With the revival of wheat growing in Wisconsin during the world war bunt became common, usually the latter species.

TUBURCINIA CLINTONIAE Kom. Rare. The three localities where it has been seen are in the southeastern, southern and northwestern parts of Wisconsin. In each case the host is *Streptopus roseus* the citation of *Smilacina stellata* being erroneous.

UROCYSTIS OCCULTA (Rabh.) Wallr. This occurs occasionally in rye fields but does little damage.

UROCYSTIS AGROPYRI (Preuss) Schroet. This occurs in southern Wisconsin on *Elymus*. A collection on *Hordeum jubatum* was made by Toole and Bennet in northeastern Wisconsin.

UROCYSTIS CEPULAE Frost. Occurs in onion fields in the southeastern part of the state.

UROCYSTIS ANEMONES (Pers.) Schroet. Common in the southern portion of the state.

UROCYSTIS WALDSTEINIAE Pk. Collected in two localities in northern Wisconsin in 1893. It has not been seen since.

ENTYLOMA LINEATUM (Cke.) Davis. Common and abundant in the southern half of the state.

ENTYLOMA CRASTOPHILUM Sacc. This has been collected in southern Wisconsin only except for the collection on *Glyceria pallida* in the northern portion.

ENTYLOMA PARVUM Davis. This inconspicuous species probably occurs throughout the state.

ENTYLOMA NYMPHAEAE (Cunn.) Setch. Throughout the state. Sometimes abundant, sometimes scarce.

ENTYLOMA MICROSPORUM (Ung.) Schroet. Frequent in southern Wisconsin on *Ranunculus septentrionalis* only.

ENTYLOMA RANUNCULI (Bon.) Schroet. Frequent and abundant in northern Wisconsin on *Ranunculus pennsylvanicus* only.

ENTYLOMA THALICTRI Schroet. Generally distributed and sometimes abundant.

ENTYLOMA MENISPERMI Farl. & Trel. Common in the southern half of the state.

ENTYLOMA FLOERKEAE Holw. This has been seen in southeastern Wisconsin only where it was locally abundant.

ENTYLOMA SANICULAE Pk. A rare species in Wisconsin. Collections have been made at Racine (1892 & '94) and Madison (1924) only, the latter on *Sanicula gregaria*.

ENTYLOMA AUSTRALE Speg. Common and abundant throughout.

ENTYLOMA LINARIAE VERONICAE Wint. Usually common and abundant at least in the southern portion.

ENTYLOMA LINARIAE GRATIOLAE Davis. This has been found in two localities in northern Wisconsin. As it has been but recently recognized it may be that it will be found to have a wider distribution.

ENTYLOMA LOBELIAE Farl. Variable in frequency and abundance from year to year.

ENTYLOMA COMPOSITARUM Farl. A common and abundant species but some of the host adapted races of which it appears to be composed are rather rare. It is most common on *Lepachys* and *Ambrosia*, least so on *Senecio*. It is sometimes

very abundant locally on *Eupatorium urticaefolium* while in other years it is not seen on that host.

ENTYLOMA POLYSPORUM (Pk.) Farl. Not uncommon on *Ambrosia artemisiaefolia* and *Rudbeckia hirta*, rare on other hosts.

BURRILLIA PUSTULATA Setch. Not frequent but usually abundant where it occurs.

DOASSANSIA ZIZANIAE Davis. This has been collected at Racine and Madison only. As the spore balls are formed in the central cavity of the lower internodes without external manifestation it is recognized only by splitting open the culms. It appears late in the season and has not been looked for at that time in the northern part of the state.

DOASSANSIA MARTIANOFFIANA (Thuem.) Schroet. Infrequent. It has been collected only on plants emersed by the recession of the water.

DOASSANSIA SAGITTARIAE (West.) Fisch. Throughout the state.

DOASSANSIA SAGITTARIAE CONFLUENS Davis. Also throughout the state.

DOASSANSIA OPACA Setch. This has been seen in the southern part of the state only where it is rare.

DOASSANSIA INTERMEDIA Setch. This has been found in the northern half of the state only. It is not frequent.

DOASSANSIA DEFORMANS Setch. This is one of the commoner species of the genus in Wisconsin and occurs throughout.

DOASSANSIA FURVA Davis. This has been collected in several localities none of which are in the southern portion. It is usually fairly abundant where it occurs.

DOASSANSIA ALISMATIS (Nees) Cornu. This was formerly the species most often seen but of late years it has not been so frequent. A cycle of abundance will probably come again.

DOASSANSIA RANUNCULINA Davis. This was thought to have disappeared from the state but it was found in very small quantity, barely enough to show its presence, at Shiocton in eastern Wisconsin and at Blue River in the southwestern part of the state. It may therefore again become abundant when conditions are favorable for successive years.

TRACYA LEMAE (Setch.) Syd. This has been collected in three widely separated localities. As it is very inconspicuous it probably has not a restricted range in the state and occurs more frequently than the collections would indicate.

UNIVERSITY OF WISCONSIN HERBARIUM,
MADISON, WISCONSIN, MARCH, 1925

NOTES ON PARASITIC FUNGI IN WISCONSIN—XIV

J. J. DAVIS

A large part of the collections of 1925 were made in the "cut-over" regions in the northern part of the state. The cumulative effect of successive dry seasons was in evidence. The effect of the removal of the trees on the moisture content of soil and air is marked in its relation to fungus parasites. It is with surprise that one observes as he walks over dry ground the presence of such plants as Iris, Caltha, Comarum, etc. To one who has known the forest floor the difference is striking. The effect of the dryness is especially evident in the later stages of development of the parasites. Leaf spots may be abundant but spore bodies few, imperfect, and with little or no formation of normal spores. A large proportion of the collections in this region were discarded.

In "Notes" V it was stated that a trace of *Bremia lactucae* Regel had been observed on *Krigia amplexicaulis*. In July 1925 it was found on this host at Altoona in sufficient quantity to furnish a herbarium specimen. Apparently infection occurs but seldom on this host. One might infer that this is not a race adapted to *Krigia* but that infection occurs exceptionally.

In "Notes" IX, p. 251, reference was made to the occurrence of mycelium and conidia supposed to be those of *Sphaerotheca humuli* (DC.) Burr. on *Rubus allegheniensis* at Madison early in the season. In late July, 1925, similar material was collected at Eau Claire on leaves of blackberry, species undetermined. Very few developed conidia were present. *Rubus triflorus* is the only species of the genus that bears perithecia commonly or abundantly in Wisconsin.

What may be the growth described and figured by Tulasne as a spermatiophorous state (*Melasmia salicina* Lev. *Carpologia* III, p. 119, tab. XV) has been rarely seen in the examination of immature ascomata of *Rhytisma salicinum* (Pers.) Fr. In one case instead of the cylindrical spermatia a small globular spermatium about 2μ in diameter was developed at the summit of each of the slender, straight, congested conidiophores. Nothing

comparable to the "stylospores" described and figured by Tulasne has been seen. As the covering of the spore body is merely the cortex of the ascoma it does not seem to be properly referred to Leptostromaceae. It is perhaps microconidial.

Phyllosticta fatiscens Pk. is evidently the same as *Ph. nupharis* Allesch. (*Phoma westendorpii* Tosq. & West.) as that species is represented in Petrak, *Fungi Bohemiae et Moraviae*, series II, no. 1744. Peck's name appears to have precedence in time.

Septoria malvicola Ell. & Mart. is now recognized as the proper designation of the species on *Malva rotundifolia* that was recorded in the provisional list under the name *Septoria heterochroa* Desm.

A collection made in June on leaves of a narrow-leaved Aster (*A. salicifolius*?) and referred to *Septoria atropurpurea* Pk. bears sporules 33-66 x 2-3 μ .

In a collection on leaves of *Ambrosia trifida* from Hollandale (June 17, 1925) the spots are not white and arid but are slightly paler portions of larger brown spots. The pyenidia are sometimes prominent and occasionally imperfect and even acervulous. The sporules are 17-30 x 1 μ acute at one end. It is believed to be a state of *Septoria bacilligera* Wint.

Because of previous use of Septoriopsis as a generic name by Fragoso and Paul, Petrak has replaced Septoriopsis Stevens & Dalbey as amended in "Notes" VII, p. 401, by Cercoseptoria (*Ann. Mycol.* 23:68). The two Wisconsin species referred to Septoriopsis therefore became *Cercoseptoria longispora* (Pk.) Petr. and *C. leptosperma* (Pk.) Petr.

Bayliss—Elliott and Stanfield find the ascigerous stage of *Polythrincium trifolii* Kze. to be referable to Dothidella and describe it as *Dothidella trifolii* n. sp. (*Trans. Brit. Myc. Soc.* 9:227 [1924]). They also observed a pycnidial state in autumn.

In transferring the description of *Cercospora pontederiae* Ell. & Dearn. to the *Sylloge Fungorum*, Saccardo queried if it were not a Cercosporella. The query seems justified and Wisconsin specimens are labeled *Cercosporella pontederiae* (Ell. & Dearn.). The development is sometimes amphigenous and the conidia longer (up to 75 μ) than indicated by the description. It has been found in Wisconsin only in the northern part.

In examining a collection of the fungus referred to *Cercospora euonymi* Ellis made in late September, conidia were observed up

to 140μ in length. The conidiophores are hyaline as in previous Wisconsin collections.

For the reception of *Gloeosporium balsameae* Davis ("Notes" VII, p. 409, pl. 30) Petrak has proposed the genus *Rhabdogloeopsis* (*Ann. Mycol.* 23: 52). There are those who would not consider the characters to be of generic value and who deprecate the multiplication of genera founded upon slight differences as a disservice to mycology. This is especially true where life histories are unknown. To such *Cryptocline*, *Rhabdogloeum* and *Rhabdogloeopsis* would constitute a subgeneric group.

The parasite recorded in the supplementary and provisional lists under the name *Cylindrosporium thalictri* (E. & E.) is the one described in the *Journal of Mycology* 3: 130 as *C. ranunculi* (Bon.) *f. thalictri* E. & E. It bears no relation to *C. ranunculi* (Bon.) Sacc. or to *Entyloma* and is quite distinct from *C. clematidis* E. & E. The acervuli are usually confined to a sharply delimited angular portion of the arid spot.

The parasite of *Carpinus caroliniana* recorded in "Notes" II, p. 106 as *Fusarium carpineum* n. sp. was found on the same host at Balsam Lake in July, 1924. The cellular base from which the conidia spring is usually simpler in these collections and many of them do not suggest a sporodochium. The spots are circular, scattered, not nervisequent, about $\frac{1}{2}$ cm. in diameter. They are not brown until death of the leaf cells takes place when by confluence irregular brown areas may be formed. The conidia are not uniformly bisepitate but develop 1-4 septa. This was found also, in small quantity, on *Carya cordiformis* growing with infected *Carpinus*. It was noted that on this host the conidia are smaller, $20-30 \times 1\frac{1}{2}-2\mu$ and not septate. Perhaps this might better be placed in *Cercoseptoria* as that genus has been treated in these notes under *Septoriopsis*.

In 1925 *Entyloma* on *Thalictrum dasycarpum* bearing conidia was collected at Armstrong Creek and at Tripoli. As it occurred in the latter locality a hyphal mat was formed on the lower surface of the spots much as in *E. menispermi* Farl. & Trel. There seems to be no good reason for attempting to keep *E. ranunculi* (Bon.) Schroet. and *E. thalictri* Schroet. separate, although they may be distinct in their host relations as is the way with smuts. On *Ranunculus* *Entyloma* has been found in Wisconsin on *R. pennsylvanicus* only but it is not infrequent on that species, especially northward, 10 collections being repre-

sented in the herbaria. It was found on *Anemone quinquefolia* at Racine in 1888 but has not been seen on that host since and I have seen no record of its occurrence elsewhere.

Collections of leaves of *Sagittaria heterophylla* have been made that bear both *Doassansia sagittariae confluens* Davis and *D. furva* Davis the spore balls of both being sometimes present in the same section.

Uredinopsis atkinsonii Magn. is united with *U. copelandi* Syd. by Arthur in *North American Flora* 7: 684.

Potentilla canadensis has been collected at Madison bearing Phragmidium and Darluca and in addition black sclerotoid bodies. This seems to be of the same character as the growth which has been called *Sphaeria solidaginis* Schw.

While *Uredo muelleri* Schroet. is considered to be aecial in character it is sometimes attacked by *Darluca filum* (Biv.) Cast., a common parasite of uredinia but not of aecia.

In June 1913 *Aecidium falcatae* Arth. occurred at Wyalusing in southwestern Wisconsin near the Wisconsin river. In looking about for a possible alternate host a coarse grass was found that had borne telia the preceding year. This was probably *Andropogon furcatus*. In 1920 another collection of the Aecidium was made at Prairie du Chien in the same region. In June 1924 it was found in abundance at Blue River in southwestern Wisconsin and in August at Danbury in the northwestern part of the state. The stations were noted and later in the season both localities were visited for the purpose of getting a clue to the alternate host. In each case *Andropogon scoparius* and *A. furcatus* were the only rusted plants in the immediate vicinity. In the spring of 1925 development of aecia on *Amphicarpa monoica* was secured in the greenhouse from infection from telia on *Andropogon*. Some years ago *Aecidium lupini* Pk. was observed to be abundant at Millston. The stations were noted and visited later in the year and *Andropogon* found to be the rusted host that seemed to be associated with it but no infection experiments were made. In *North American Flora* 7: 625-6, Arthur has united *Aecidium falcatae* Arth. *Ae. lupini* Pk. and described species on other genera of Leguminosae. It seems probable that there is a rust on *Andropogon* that develops on various Leguminosae. How much differential host adaptation there is remains to be seen. *Andropogon* seems to be a complacent host for rusts.

In "Notes" XI, pp. 301-2, reference was made to the occurrence of *Puccinia punctiformis* Diet. & Hol. in Wisconsin with the suggestion that it was "presumably a waif in Wisconsin and perhaps will not be able to maintain itself in this climate". In 1925 uredinia were found beside the railroad at Madison about a mile from where it had been noticed in 1922.

ADDITIONAL HOSTS

Microsphaera alni (Wallr.) Wint. On *Rhamnus alnifolia*. Pembine.

Ascochyta thaspii saniculae Davis. On *Sanicula gregaria*. Argyle.

Melasmia ulmicola B. & C. On *Ulmus racemosa*. Ingram.

Colletotrichum graminicolum (Ces.) Wils. On *Bromus putans*. Balsam Lake.

What appears to be an imperfectly developed state of *Marssonina kriegeriana* (Bres.) Magn. was collected at Argonne on *Salix balsamifera*.

Cylindrosporium triosteum Kell. & Swingle. On *Triosteum aurantiacum*. Spring Valley. In this collection the acervuli are epiphyllous.

Microstroma juglandis (Bereng.) Sacc. On *Carya cordiformis*. Balsam Lake.

Ramularia vaccinii Pk. was collected on *Vaccinium pensylvanicum* at Wausauke in 1913 but not recorded. It was found on *V. canadense* at Ogema in 1925.

Cercospora dubia (Riess) Wint. On *Chenopodium hybridum*. Danbury.

Puccinia gentianae (Strauss) Lk. Uredinia and telia on *Gentiana puberula*. Taylor.

Puccinia patruelis Arth. Aecia on *Lactuca villosa* and *Hieracium canadense*. Hollandale.

ADDITIONAL SPECIES

A collection on living leaves of *Betula pumila* from Danbury corresponds with immature specimens of *Dothidella betulina* (Pers.) Sacc. This was referred to *Phyllachora* by Fuckel and to *Euryachora* by Schroeter and by Theissen & Sydow.

In August 1920 a trace of *Taphrina struthiopteridis* Nishida was found at Spooner on *Onoclea Struthiopteris*. In late July 1925 it was again found at Weyerhaeuser in sufficient quantity

to furnish a herbarium specimen and warrant recording. The infected pinnae resemble those attacked by *Uredinopsis*.

At Millston in September 1924 many leaves of *Rubus hispida* showed orbicular dead spots, cinereous with a purple border, about 5 mm. in diameter. In the center of the spots on the upper surface were remains of old sori of *Uredo muelleri* while on the lower surface were scattered pycnidia of *Coniothyrium fuckelii* Sacc. Presumably the latter had developed on tissue that had been injured by the rust.

***Ascochyta baptisiae* n. sp.**

Spots suborbicular, dull black, more or less argillaceous zoned, 3-6 mm. long, nearly alike on both surfaces; pycnidia epiphyllous, somewhat prominent, argillaceous, subepidermal, globose, ostiolate, $85-150\mu$ in diameter; sporules hyaline, cylindrical with rounded ends, straight or nearly so, uniseptate or occasionally with 2 or 3 septa, $12-30 \times 4-7\mu$. On leaves of *Baptisia leucantha*. Avoca, Wisconsin, October 8, 1924.

***Stagonospora petasitidis* Ell. & Ev.**

On *Petasites palmatus*. Tripoli. In this collection, made in mid-August, the areas over which the pycnidia are scattered are mostly brown and dead. On these dead areas the pycnidia are, for the most part, empty or contain but few more or less imperfect sporules.

In late August and early September collections were made in several localities in northeastern Wisconsin of a parasite of *Populus balsamifera*. On examination these showed numerous epiphyllous pycnidia on indefinitely limited brown spots in which however sporules had not developed. I am indebted to President Dearnness for an opportunity to examine a portion of the type of *Phyllosticta brunnea* Dearn. & Barth. on leaves of *Populus angustifolia* from Colorado and for the suggestion that the Wisconsin collections are of that species, a suggestion that is borne out by the comparison. Material collected later in the season would perhaps have shown further development.

***Graphium sorbi* Pk.**

On *Pyrus americana*. Armstrong Creek. In this collection the synnemata are few and the conidia immature, corresponding to the rule in collections of the year 1925.

***Puccinia ambigua* (A. & S.) Lagh.**

Aecia and telia on *Galium Aparine*. Spring Valley.

Coleosporium helianthi (Schw.) Arth.

Uredinia and telia on *Helianthus strumosus*. A single collection made at Madison.

NOTES ON DISTRIBUTION AND ABUNDANCE IN
WISCONSIN

MELAMPSORACEAE

Including *Coleosporium*

MELAMPSORA FARLOWII (Arth.) Davis.

This has been observed in the northeastern corner of the state only.

MELAMPSORA BIGELOWII Thuem.

Common and abundant throughout the state.

MELAMPSORA HUMBOLDTIANA Speg.

This has been so confused with the preceding species that its range or abundance is not well known. The aecial stage has been collected in the northeastern and northwestern sections only.

MELAMPSORA MEDUSAE THUEM.

Common and abundant.

MELAMPSORA POPULI TSUGAE Davis (M. ABETIS-CANADENSIS (Farl.) C. A. Ludwig)

Known only from the north eastern part of the state accompanying *M. farlowii* (Arth.) Davis.

MELAMPSORA LINI (Pers.) Desm.

Occurs in flax fields and also on *Linum sulcatum* on which it is sometimes abundant in the western part of the state.

MELAMPSORA CERASTII (H. Mart.) Schroet.

Aecia were formerly rather common in northern Wisconsin but are now rare according to my experience. Uredinia or telia have not been recognized in Wisconsin.

MELAMPSORIDIUM BETULINUM (Pers.) Kleb.

Apparently a rare species in Wisconsin. But one collection of aecia has been made, but they were abundant at that station which was in the northwestern part of the state. Two collections of uredinia have been made in the southern part of the state and one in the northern.

CALYPTOSPORA GOEPPERTIANA Kuehn.

Very rare in Wisconsin. But a single collection.

CHRYSMYXA PIROLAE (De.) Rostr.

Occurs throughout the state.

CHRYSMYXA LEDICOLA (Pk.) Lagh.

The telia of this and cognate species are formed so early in the season that they disappear before the localities are visited. One collection of telia referred to this species was made in north-eastern Wisconsin. Uredinia have not been seen. A few collections of aecia have been made in the northern part of the state.

CHRYSMYXA LEDI (A. & S.) DBy.

Common northward. Telia have not been seen. Aecia have not been recognized; perhaps they have been confused with those of the next species.

CHRYSMYXA CASSANDRAE (Pk. & Cl.) Tranz.

Common and abundant in the spruce bogs but telia have not been collected. Aecia on *Picea mariana* are common and abundant.

CHRYSMYXA CHIOGENIS Diet.

A rare species collected only in a somewhat limited region in the northern part of the state. No collection has been made since 1903. Moist, mossy, well shaded logs with Chiogenes trailing over them are not abundant since deforestation and forest fires.

actostaphyli
CHRYSMYXA CHIOGENIS Diet.

Of still more restricted range in the northern part of the state.

PUCCINIASTRUM PUSTULATUM (Pers.) Diet.

Common and abundant on the larger species of *Epilobium*. The telia are most abundant on *Epilobium angustifolium*.

PUCCINIASTRUM PYROLAE (Pers.) Diet.

The uredinia occur on various species of *Pyrola* throughout the state except that there are no collections from the south-eastern portion. But one collection has been made on *Chimaphila*. Aecia and telia have not been seen.

PUCCINIASTRUM MYRTILLI (Sehum.) Arth.

Aecia are sometimes abundant. Uredinia are usually sparsely developed. Telia have been seen in two collections. Because of the intracellular position of the teliospores, this is considered to be generically distinct by some authors who designate it *Thecopsora*.

HYALOPSORA ASPIDIOTUS Pk.

This has been collected in the extreme northeastern portion of the state only.

HYALOPSORA POLYPODII (Dc.) Magn.

Common in southern and eastern Wisconsin.

UREDINOPSIS PHEGOPTERIDIS Arth.

The least common of the species of the genus in Wisconsin. It occurs in the northern part of the state only.

UREDINOPSIS COPELANDI Syd. (*U. atkinsonii* Magn.)

Not uncommon but often poorly developed apparently from early death of the infected tissue.

UREDINOPSIS MIRABILIS (Pk.) Magn.

The most common and abundant species of the genus often at long distance from the aecial host.

UREDINOPSIS STRUTHIOPTERIDIS Stoermer.

Common and abundant northward.

PUCCINIASTRUM OSMUNDAE Magn.

Common and abundant especially northward. The aecial stage of the species of this genus, *Peridermium balsameum* Pk., is common where the host occurs but no segregation has been made. All of them develop teliospores, the first and last most abundantly.

PUCCINIASTRUM POTENTILLAE Kom.

With the range of the host which is northwestern but extending south considerably below the "middle." No telia have been found.

PUCCINIASTRUM AMERICANUM (Farl.) Arth.

Throughout the state on the single species of host *Rubus idaeus aculeatissimus*. Telia are frequent.

PUCCINIASTRUM ARCTICUM (Lagh.) Tranz.

Throughout the state on *Rubus triflorus* only. No telia have been seen. It is more abundant northward.

PUCCINIASTRUM AGRIMONIAE (Schw.) Tranz.

Common and abundant throughout. No telia seen.

CRONARTIUM COMPTONIAE Arth.

All of the stages occur somewhat abundantly in northern Wisconsin.

CRONARTIUM QUERCUS (Brondeau) Schroet.

A common species throughout the range of the aecial host, *Pinus Banksiana*. The telia occur most frequently and abundantly on *Quercus velutina*.

CRONARTIUM COMANDRAE Pk.

The aecial stage appears to be but sparsely developed but the later stages are much more common and abundant, often at long distance from the aecial host.

CRONARTIUM RIBICOLA FISCH.

Still occurs to some extent in northwestern Wisconsin.

CRONARTIUM OCCIDENTALE Hedge, Bethel & Hunt.

Reported as having been collected on Ribes at two stations in northern Wisconsin in the course of the white pine blister rust survey.

CEROTELIUM URTICASTRI Mains.

Probably of wide range in the state. Aecia have been collected in the southern part only probably because more northern territory has not been visited early enough in the season.

COLEOSPORIUM RIBICOLA (C. & E.) Arth.

Collected in northern Wisconsin in 1918 in the course of the white pine blister rust survey. I have not seen it myself in the field.

COLEOSPORIUM VIBURNI Arth.

Not uncommon and sometimes rather abundant in the southern and eastern portions of the state.

COLEOSPORIUM CAMPANULAE (Pres.) Lev.

This species was included in the state flora on the basis of a fragmentary specimen on *Campanula rotundifolia* bearing uredinia collected at Prairie du Sac in 1891 by H. F. Lueders. By some error the host was given in the list as *C. americana*. Nothing further was known of the occurrence of this rust in the state until 1922 when uredinia were found on *Campanula aparinoides* at Blue River in the south western part of the state and in 1923 on the lake Superior shore.

COLEOSPORIUM SOLIDAGINIS (Schw.) Thuem.

Common and abundant throughout the state. But few collections of aecia have been made.

COLEOSPORIUM HELIANTHI (Schw.) Arth.

The first and only collection was made at Madison in 1925.

COLEOSPORIUM SONCHI-ARVENSIS (Pers.) Lev.

This has been found in but a single locality in northeastern Wisconsin.

UNIVERSITY OF WISCONSIN HERBARIUM.

MADISON, WISCONSIN, APRIL, 1926.

INDEX TO HOSTS AND PARASITES
Referred to in "Notes" XII, XIII, and XIV.
The names of parasites are in *italics*.

Abies balsamea, 169
Actaea rubra neglecta, 160
Acicidium falcatae Arth., 184
Acicidium lupini Pk., 184
Acicidium myosotidis Burr., 162
Agrimonia gryposepala, 158
Alticugo candida (Pers.) Kuntze, 158
Alnus crispa, 169
Ambrosia trifida, 182
Amphicarpa monoica, 184
Anaphalis margaritacea, 161
Andropogon furcatus, 184
Andropogon scoparius, 184
Anemone quinquefolia, 184
Antirrhinum majus, 162
Arabis laevigata, 158
Arctium minus, 161
Aristida tuberculosa, 162
Artemisia biennis, 158
Artemisia caudata, 173
Artemisia serra, 155
Artemisia ludoviciana, 155
Asclepias tuberosa, 170, *Cleopatra*
Ascochyta baptisiae n. sp. 186
Ascochyta compositarum Davis, 159
Ascochyta lib, 169
Ascochyta thaspii E. & E., 159
Ascochyta thaspiae saniculae Davis, 185
Aster azurens, 160
Aster paniculatus, 160
Aster sagittifolius, 160
Aster Tradescantii, 155, 160
Asterina rubicola, 165
Asteroma atratum Chev., 161
Asteroma lactucae, 161
Asteromella, 156
Baptisia leucantha, 186
Barbarea stricta, 160
Betula alba, 172
Betula pumila, 185
Bremia lactucae, Regel 181
Bromus purgans, 185
Calamagrostis canadensis, 166
Calamagrostis longifolia, 169
Campanula aparinoides, 174
Carpinus caroliniana, 170, 171, 183
Carya cordiformis, 170, 184³
Cassia marylandica, 162
Cerastium nutans, 155
Cercoseptoria leptosperma (Pk.) Petr., 182
Cercoseptoria longispora (Pk.) Petr., 182
Cercoseptoria minuta n. sp., 174
Cercospora clavata (Ger.) Pk., 170
Cercospora dubia (Riess) Wint., 185
Cercospora euonymi Ellis, 182
Cercospora helvola, Sacc., 160
Cercospora leptandrae n. sp., 162
Cercospora oculata E. & K., 157
Cercospora perfoliata E. & E., 160
Cercospora platyspora E. & H., 167
Cercospora pontederiae E. & Dearn., 182
Cercospora sedoides E. & E., 157
Cercospora sti E. & E., 168
Cercospora simulata E. & E., 162
Cercospora subsanguinea E. & E., 168
Cercospora varia Pk., 166
Cercospora vernoniae E. & K., 157
Cercospora viciae Ell. & Hol., 157, 170
Cercospora zebrina Pass., 160
Cercosporella nivea E. & Barth., 170
Cercosporella pontederiae (Ell. & Dearn.) n. comb., 182
Cercosporidium fasciculatum (C. & E.) Hoehn., 168
Chenopodium hybridum, 185
Cicuta maculata, 159, 161
Cinna latifolia, 159, 160
Cladosporium phragmitis Opiz, 168
Coccochora rubi Davis, 165
Coleosporium helianthi (Schw.) Arth., 187
Colletotrichum fusarioides (O'Gara) Dearn., 169
Colletotrichum graminicolum (Ces.) Wils., 169, 185
Colletotrichum salmonicolor O'Gara, 169
Colletotrichum violarum Davis, 169
Coniothyrium fucellii Sacc., 186
Cornus alternifolia, 173
Cornus canadensis, 167
Corylus rostrata, 165
Cylindrosporella, 166
Cylindrosporium betulae Davis, 169
Cylindrosporium salicifoliae (Trel.) Davis, 157
Cylindrosporium thalictri (E. & E.), 183
Cylindrosporium triosteum Kell. & Sw. 162, 173, 185
Cylindrosporium vermiforme Davis, 169
Cynoglossum officinale, 173
Cytopidilopspora elymina Davis, 166
Darluca filum (Biv.) Cast., 184
Davisiella, 166
Diplocarpon, 165
Doassansia furea Davis, 184
Doassansia sagittariae confusa, 184
Doassansia zizaniiae Davis, 157
Dothidella betulina (Pers.) Sacc., 185
Dothidella trifolii B. E. & S., 182
Echinocloa crusgalli, 163
Elymus, 157, 166
Endostigme, 155
Entyloma compositarum Farl., 160
Entyloma linariae gratiolae Davis, 169
Entyloma ranunculi (Bon.) Schroet., 183
Entyloma thalictri Schroet., 183
Erechtites hieracifolia, 161
Eupatorium purpureum, 159, 160
Fusarium carpineum Davis, 170, 183
Fuscladium depressum (B. & Br.) Sacc. 167
Fuscladium punctiforme Wint., 167
Fuscladium 155, 167
Galium aparine, 186
Galium boreale, 170
Gentiana puberula, 185
Geranium Bicknellii, 169
Geranium maculatum, 171
Geum canadense, 159
Geum strictum, 159
Geum virginianum, 159
Gloeosporium balsameae Davis, 183
Gloeosporium betulae-papyriferae Dearn. & Overholts, 169
Gloeosporium coryli (Desm.) Sacc., 165
Gloeosporium equiseti E. & E., 168
Gloeosporium fusarioides E. & K., 169
Gloeosporium niveum n. sp., 171
Gloeosporium septorioides Sacc., 159
Glomerella cingulata (Stonem.) Sp. & Von Schr., 169
Glomerularia corni Pk., 167
Glomerularia lonicerae Dearn. & House, 167
Graphium sorbi Pk., 186
Helianthus strumosus, 187
Heterosporium gracile Sacc., 165
Hieracium canadense, 185
Hypodermella ampla (Davis) Dearn., 166
Hystrix, 157
Ilex verticillata, 171
Krigia amplexicaulis, 181
Lactuca canadensis, 161
Lactuca villosa, 185
Lappula virginiana, 173
Lathyrus ochroleucus, 170
Lathyrus palustris, 169
Lathyrus venosus, 157
Leersia lenticularis, 162
Leersia oryzoides, 162
Leersia virginica, 162
Lepachys pinnata, 161
Leptothyrium dryinum Sacc., 156
Leptothyrium maculicolum Wint., 156
Loniceria canadensis, 167
Loniceria oblongifolia, 167
Lophodermium amplum Davis, 166
Ludwigia polycarpa, 162
Lycopus americanus, 159

Lycopus uniflorus, 159, 160
Malva rotundifolia, 182
Mamiani fimbriata (Pers.) Ces. & DeN., 171
Marssonina kriegeriana (Bres.) Magn., 185
Marssonina martinii (S. & E.) Magn., 159
Marssonina potentillae tormentillae Trail, 159
Melampyrum lineare, 162
Melampsora caryophylacearum, 169
Melanconium bicolor Nees, 172
Melasmia salicina Lev., 181
Melasmia ulmicola B. & C., 185
Microsphaera alni (Wallr.) Wint., 185
Microstroma juglandis (Bereng.) Sacc., 185
Mollisia earliana Sacc., 165
Montagnella heliospidis (Schw.) Sacc., 155
Mycosphaerella lethalis Stone, 165
Mycosphaerella pinodes (B. & Blox.) Niessl., 165
Myosotis virginica, 159, 162
Oenothera pumila, 160
Onoclea Struthiopteris, 185
Osmorhiza longistylis, 170
Ovularia asperifolii lappulae Davis, 173
Ovularia decipiens Sacc., 162
Passalora depressa (B. & Br.) Hoehn., 167
Passalora fasciculata (C. & E.) Earle, 168
Passalora punctiformis (Wint.) Hoehn., 167
Penthorum sedoides, 157
Peridermium coloradense (Diet.) Arth. & Kern., 169
Peridermium elatinum A. & S., 169
Peronospora alsinearum Casp., 155
Peronospora leptosperma DeBy., 155
Peronospora myosotidis DeBy., 158
Peronospora parasitica (Pers.) Tul., 158
Peronospora potentillae DeBy., 158
Peronospora Sordida B. & Br., 169
Peronospora tomentosa Fckl., 155
Petasites palmatus, 186
Phacidium tazi Fr., 165
Phleospora salicifoliae (Trel.) Petr., 157
Phyllachora 159, 166
Phyllachora graminis (Pers.) Fckl., 157
Phyllosticta brunnea Dearn. & Barth., 186
Phyllosticta fatiscens Fckl., 182
Phyllosticta lappae Sacc., 161
Phyllosticta negundinis Sacc. & Speg., 171
Phyllosticta nupharis Allesch., 182
Phyllosticta phomiformis Sacc., 156
Phyllosticta renouana Sacc. & Roum., 166
Phyllosticta steironematis Dearn. & House, 161
Phyllosticta typhina Sacc. & Malb., 166
Picea mariana, 169
Piggotia fraxini B. & C., 156
Piricularia parasitica E. & E., 157
Pisum sativum, 171
Plasmopara geranii (Pk.) Berl. & DeB., 169
Plasmopara nivea (Ung.) Schroet., 161
Poa annua, 170
Polygonum, 155
Polygonum ciliinode, 156
Polygonum trifolii Kze., 182
Populus balsamifera, 186
Potentilla canadensis, 159, 160, 184
Puccinia ambigua (A. & S.), Lagh., 186
Puccinia angustata Pk., 160
Puccinia antirrhini D. & H., 162
Puccinia flaccida B. & Br., 162
Puccinia gentianae (Strauss) Lk., 185
Puccinia graminis Pers., 160, 170
Puccinia jussiaeae Speg., 162
Puccinia patruelis Arth., 185
Puccinia peckii (DeT.) Kell., 160
Puccinia punctiformis D. & H., 185
Pyrus americana, 186
Quercus alba, 156, 159
Ramularia octaeae E. & H., 160
Ramularia aequivoca (Ces.) Sacc., 160
Ramularia arvensis Sacc., 160
Ramularia artemisiae n. sp., 173
Ramularia asteris (Phil. & Plowr.) Bubak, 160
Ramularia barbareae (Pk.), 160
Ramularia corynoglossi Lindr., 173
Ramularia gracilipes n. sp., 173
Ramularia lappulae n. comb., 173
Ramularia lysimachiae Thuem., 156
Ramularia magnusiana (Sacc.) Lindau
Ramularia melampyri Ell. & Dearn., 162
Ramularia pratensis Sacc., 160
Ramularia reticulata E. & E., 170
Ramularia rubicunda Bres., 168
Ramularia vaccini Pk., 185
Ramularia waldsteiniae Ell. & Davis, 167
Ranunculus acris, 160, 162
Ranunculus pennsylvanicus, 183
Rhamnus alnifolia, 185
Rhytisma print Schw., 171
Rhytisma salicinum (Pers.) Fr. 171, 181
Rosenschedia, 155
Rubus allegheniensis, 181
Rubus hispida, 186
Rubus triflorus, 170, 181
Rudbeckia laciniata, 160
Rumex persicarioides, 160
Saccharum, 166
Sagittaria heterophylla, 184
Salix balsamifera, 185
Salix humilis, 160, 171
Salix petiolaris, 171
Sanicula gregaria, 185
Sclerotinia geranii Seaver & Horne, 171
Scolecotrichum graminis Fckl., 168
Scolecotrichum maculicola E. & K., 168
Scrophularia leporella, 169
Septogloeum salicinum (Pk.) Sacc., 160
Septoria atropurpurea Pk., 182
Septoria bacilligera Wint., 182
Septoria detospora Sacc., 168
Septoria diervillae E. & E., 156
Septoria diervillae Pk., 156
Septoria diervillicola E. & E., 156
Septoria ellissii Berl. & Vogl., 167
Septoria erechitis E. & E., 161
Septoria flagellifera E. & E., 171
Septoria gei Rob. & Desm., 159
Septoria gratiolae Sacc. & Speg., 167
Septoria heterochroa Desm., 182
Septoria infuscata Wint., 161
Septoria lycopi Pass., 159
Septoria malvicola E. & M., 182
Septoria margaritacea Pk., 161
Septoria microsperma Pk., 166
Septoria polygonorum Desm., 155
Septoria pslostegae E. & M., 170
Septoria rubi West., 170
Septoria salicola (Fr.) Sacc., 171
Septoria violae West., 159
Septoriopsis Stevens & Dalbey, 182
Sisymbrium altissimum, 158
Solidago juncea, 170
Solidago uliginosa, 170
Sphaerotheca humuli (DC.) Burr., 181
Spiraea densiflora, 157
Spiraea salicifolia, 157
Stagonospora petasitidis E. & E., 186
Steironema ciliatum, 156, 161
Stigmella rubicola (E. & E.) Theiss., 165
Synchytrium aureum Schroet., 158
Synchytrium nigrescens Davis, 158
Taenidia, 167
Taphrina struthiopteridis, 185
Taphrina ulmi (Fckl.) Johans., 155
Taxus canadensis, 165
Thalictrum dasycarpum, 183
Tilletia corona Scribn., 162
Titaeospora detospora (Sacc.) Bubak, 168
Trientalis americana, 167
Trifolium dubium, 160
Triosteum aurantiacum, 185
Triosteum perfoliatum 162, 173
Ulmus americana, 155
Ulmus racemosa, 185
Uredinopsis atkinsonii Magn., 184
Uredinopsis copelandii Syd., 184
Uredo muelleri Schroet., 184
Uromyces seditus Kern., 162
Ustilago sphaerogenes Burr., 162
Vaccinium canadense, 185
Vaccinium pensylvanicum, 185
Vermicularia violae-rotundifoliae (Sacc.) House, 168
Veronica virginica, 162
Viburnum pubescens, 166
Viola lanceolata, 159
Viola scabriuscula, 168

NOTES ON PARASITIC FUNGI IN WISCONSIN.
XV, XVI, AND XVII

By J. J. DAVIS

REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY OF
SCIENCES, ARTS, AND LETTERS, VOL. XXIV

Issued November, 1929

19 AUG 1958

NOTES ON PARASITIC FUNGI IN WISCONSIN. XV

J. J. DAVIS

In "Notes" XIV, p. 185, *Taphrina struthiopteridis* Nishida was recorded as occurring in Wisconsin. On referring to the specimen in the herbarium it is found to be labeled *Taphrina hiratsukae* Nishida.

In *Annales Mycologici* 23: 63-4 is a note by Petrak on *Phyllosticta iridis* Ell. & Mart. in which he refers it to *Phlyctaena*. As he stated, the material that he examined was over-mature. Had he examined younger material he would have found that the pycnidia are perfect and hence that there is no need of removing it from *Phyllosticta* because of imperfect pycnidia.

Ascochyta wisconsina Davis ("Notes" II, 101) was referred to that genus because a few septate sporules were found. In a recent collection on *Sambucus canadensis* nearly all of the sporules have a median septum. Some of them are a little longer (12μ) than the description indicated.

In the original description of *Septoria pachyspora* Ell. & Hol. the pycnidia are said to be "on snow-white, thin, small (1-2 mm.), subangular to nearly round spots surrounded by a broad purplish shaded border" (*Journ. Mycol.* 1: 6). In the record of its occurrence in Wisconsin it was stated that the spots lacked the colored border (*Trans. Wis. Acad.* 9: 177). In a recent collection (Brodhead, Wis., Sept. 26, 1926) the leaves are somewhat faded and yellowish and the spots are merely small areas that have retained the deep green color with a tendency to become blackish in the central portion, the location of the pycnidia being indicated by whitish points due to exuded sporules. In the original description, which was copied in Martin's "Septoriæ of North America" (*Journ. Mycol.* 3: 67) the width of the sporules was given as 3μ which was perhaps a mis-

print for 5μ inasmuch as they approach the phragmosporous form as indicated by the specific name that was applied. In some collections the spots become arid and the sporules are narrow, probably because of unfavorable conditions. In reporting upon the determination of specimens a well known mycologist, who has described many species of North American Fungi, stated that he had been influenced more by the character of the spots than by those of the spores. It has become evident that spot characters depend largely on environmental influences affecting the host and should be used with caution in taxonomy.

A specimen on leaves of *Helianthus* from Lynxville (July 17, 1916) shows angular spots 2-5 mm. in diameter which are black-brown above, lighter on the lower surface. The pycnidia are hypophyllous, small, scattered, the sporules mostly curved, $27-37 \times 1-1\frac{1}{2}\mu$. This is labeled *Septoria paupera* Ellis. The host is a form with rather thin triple-nerved leaves.

By an unfortunate error it was stated in "Notes" XIII, p. 172, that *Fungi Columbiana* 2593 represents *Gloeosporium niveum* Davis. The number should be 3491, 2593 being as labeled.

What appears to be the parasite recorded in "Notes" I, p. 89 under the name *Colletotrichum helianthi* n. sp. was distributed in Ellis & Everhart *North American Fungi*, second series 2778 as *Vermicularia helianthi* n. sp. The specimen is from Kansas on *Helianthus rigidus* collected by W. T. Swingle. Apparently no description was published.

In "Notes" XI, p. 291, the statement was made that I had seen no description of the parasite on *Fraxinus oregana* issued in *Fungi Columbiani* 4415, 4719, and 4816 under the name *Cylindrosporium fraxini* (Ell. & Kell.) Ell. & Ev. Ellis & Everhart *North American Fungi*, second series 1634, *Septogloeum fraxini* Hark. is the same fungus. As the material was provided by Dr. Harkness it may be assumed to be authentic, but the description of the spots as given in Saccardo, *Sylloge Fungorum* 3: 802, "Maculis minutis, albidis, angulosis" would not suggest it.

In the first "supplementary list of parasitic fungi of Wisconsin" *Phleospora oxyacanthae* (Kze. & Schm.) was recorded as occurring in the state. In carrying this over into the "provisional list" the specific name was erroneously printed "crataegi". In "Notes" III, p. 254, a short description of the parasite was given showing characters quite different from those of *Phleospora*. In "Notes" X it was stated that it had been compared with an authentic specimen of *Cercosporella mirabilis* Pk. with which it agreed. Since then I have examined *Cylindrosporium crataegi* Ell. & Ev. as represented in *North American Fungi* 3182 and find that to be the same parasite. I do not find the acervuli mentioned by Ellis & Everhart (*Proc. Acad. Nat. Sci. Phila.* 1894, p. 372) nor yet differentiated conidiophores as stated by Peck and am labeling it ***Cercoseptoria crataegi* (E. & E.) n. comb.** Peck stated that "This is a remarkable, aberrant and variable species and possibly the type of a new genus" (Report of the State Botanist, 1911, p. 46). The genus to which it is here referred had not at that time been proposed. Infected leaves may be unspotted or spotted in various degrees, apparently according to age and amount of infection.

Saccardo referred to *Cercospora nasturtii* Pass. as subspecies *barbareae*, a form on *Barbarea vulgaris*, and figured it in *Fungi Ital.* del. 648. A collection on *Barbarea stricta* from Wauwatosa, however, bears more cylindrical and multiseptate conidia like those of *Cercospora armoraciae* Sacc. as figured in *F. Ital.* del. 646. In this collection on *Barbarea stricta* both conidiophores and conidia range up to 125μ or more in length. It may be that such forms on Cruciferae as have been named *C. nasturtii* Pass., *C. armoraciae* Sacc., *C. cheiranthi* Sacc. etc., will be found to be conspecific. Examination of a specimen labeled *Cercospora cruciferarum* E. & E. in Ellis & Everhart, *North American Fungi*, 1995, showed *Septoria sisymbrii* Ellis.

In "Notes" VIII, p. 429, record was made of a *Cercospora* on *Lespedeza capitata* with the suggestion that it was perhaps a northern form of the parasite which Atkinson described, from material collected in Alabama, as *Cercospora flagellifera*. The Wisconsin plant is doubtless *Cer-*

cospora lespedezae Ell. & Dearn. which was described from Canadian material. Length of conidiophores and of conidia are variable characters in this genus. *Cercospora latens* Ell. & Ev. is probably a form of the same species. In the description of this (*Journ. Mycol.* 4: 3), the host was given as *Psoralea argophylla*, but the error was later corrected.

In "Notes" XIV the statement was made that *Amphicarpa monoica* had been infected in the greenhouse with teliospores from *Andropogon* as the infecting agent and *Aecidium falcatae* Arth. as the result. In the spring of 1926 infection of *Andropogon furcatus* was brought about in the greenhouse from exposure to aeciospores from *Amphicarpa*.

In June, 1926, *Aecidium xanthoxyli* Pk. was found in abundance on *Zanthoxylum americanum* in the bottomlands opposite Sauk City, but no clue had been secured as to the alternate host. However, having potted plants of *Andropogon furcatus* in the greenhouse they were exposed to infection from the *Aecidium*, with the result that uredinia and at length telia developed. The uredospores from this infection are of the *Puccinia pustulata* type referred to in *North American Flora* as the Santalaceous race. The situation with regard to *Puccinia* on *Andropogon* is evidently somewhat complicated. As the plants of *Andropogon* that were infected by aecia on *Amphicarpa* and on *Zanthoxylum* had the same origin there is no question of racial differentiation of the telial hosts.

The first collection of aecia of *Puccinia sorghi* Schw. in Wisconsin was made at Blue River, June 19, 1926 on *Oxalis corniculata*. The aecidium was abundant in a station but a few feet across on an old road running through brushland. A collection on *Oxalis "cymosa?"* was made on the University farm July 20, 1926, by J. G. Dickson.

A Phragmidium which occurs commonly in Wisconsin on *Potentilla canadensis* was recorded under the name *Phragmidium potentillae-canadensis* Diet. with the description of which all American specimens that I have examined agree. This was separated from *Ph. tormentillae* Fckl. (*Ph. obtusum* (Strauss) Lk.) of Europe because of the

smaller number of cells in the teliospores. October 2, 1925 a collection on *P. canadensis* was made at Madison having teliospores extremely variable in size and septation from which the following notes were made: Teliospores straight or somewhat curved, $33-280\mu$ long, 2-16 celled, the cells either uniform or varying in length and width in the same spore, the septa usually transverse but exceptionally more or less oblique. Size of individual cells measured $15-36\times 14-33\mu$. Germ pores single. As but one collection of this character has been made it is presumably an abnormal development. Occasionally there is an appearance that suggests proliferation of spores, but usually it seems more like proliferation of cells.

ADDITIONAL HOSTS

Peronospora ficariae Tul. A very scanty development on radical leaves of *Ranunculus abortivus*. Blue River.

Erysiphe cichoracearum DC. occurred at Brodhead on *Artemisia ludoviciana*. Perithecia were very few but pycnidia of *Cicinnobolus* were abundant but sterile.

Pseudopeziza medicaginis (Lib.) Sacc. On *Melilotus alba*. Madison. (F. R. Jones) Sometimes abundant on this host.

Phyllosticta decidua Ell. & Kell. On *Eupatorium sessilifolium*. Prairie du Chien.

Septoria anemones Desm. On *Anemone virginiana*. Potosi. I have seen no record of the occurrence of the parasite on this host. The specimen corresponds with some of those on *A. nemorosa*.

In the provisional list *Aster Shortii* was recorded as a host of *Septoria solidaginicola* Pk. A recent collection on this host made at Lynxville, July 17, 1926, however, is of quite a different type as is indicated by the following notes. Spots suborbicular, purple to brown above, lighter brown below, often containing a small white arid spot, mostly 4-5 mm. in diameter; pycnidia few, scattered, globose to depressed-globose, extending through the leaf from epidermis to epidermis but the ostiole epiphyllous where the wall is

thickest, 100-165 μ in diameter; sporules usually somewhat curved, tapering toward the acute apex, 50-85 \times 3 μ . This is referred to *Septoria atropurpurea* Pk.

From a collection on *Aster sagittifolius* made at Madison September 29, 1925 the following notes were made: spots brown, suborbicular to angular, 5-10 mm. in diameter, sometimes confluent; conidiophores amphigenous, more abundant below, fasciculate from a more or less stromatoid base, hyaline, straight or somewhat curved, cylindrical to subulate-cylindrical, usually simple, continuous, 12-30 x 2-3 $\frac{1}{2}\mu$; conidia hyaline, cylindrical, mostly 1-3 septate, sometimes catenulate, 15-50 \times 2-3 μ . The longer conidia become uniformly 3-septate. This has been labeled *Ramularia virgaureae* Thuem. Perhaps it bears relation to *Cercospora viminei* Tehon.

Cercosporella pyrina Ell. & Ev. On *Pyrus ioensis*. Brodhead. In this collection the conidia are 25-50 \times 6-8 μ . What appear to be immature perithecia occur beneath the upper epidermis.

Cercospora caricina Ell. & Dearn. On *Carex folliculata*. Millston.

Cercospora umbrata Ell. & Hol. On *Bidens connata*. Bridgeport and Camp Douglas. On *Bidens vulgata*. Sheboygan Falls.

A collection on *Ambrosia psilostachya* (Brodhead, Sept. 13, 1926) bears Cercospora on spots which are amphigenous, immarginate, at first yellowish green, then yellow and finally brown with death of the included tissue, 2-5 mm. in diameter, often confluent; conidiophores sometimes fasciculate, sometimes erect racemose branches from superficial brown, repent hyphae or from scandent hypae that ascend the trichomes, sub-hyaline, straight or somewhat tortuous or geniculate, continuous, rarely branched, 20-40 \times 4-6 μ ; conidia hyaline, obclavate-cylindrical, straight or somewhat curved, 50-100 \times 4 μ . The common Cercospora on *Ambrosia trifida* has been referred to *Cercospora racemosa* Ell. & Mart. (*Fungi Columbiani* 2117) and *Cercospora ferruginea* Fckl. (*F. Col.* 3207). The former reference was

based largely upon finding infected *Teucrium* and *Ambrosia* growing together but field observation in Wisconsin suggests that the propinquity was casual. The specimen has been labeled *Cercospora ferruginea* Fckl. It will probably be some time before the relationships of the brown Cercosporas on Compositae become known. In a growth of the kind referred to here there is room for argument as to where mycelium ends and conidiophores begin. On *Ambrosia trifida* the conida are sometimes terete, constricted at the septa, moniliform or finally catenulate. Apparently it has never been found on the ubiquitous *Ambrosia artemisiaefolia*.

Uromyces plumbarius Pk. Uredinia on *Gaura biennis*. Brodhead.

Puccinia vilfae Arth. & Hol. Aecia (*Aecidium verbenicolum* Ell. & Kell.) on *Verbena urticaefolia* and *V. stricta*. Prairie du Chien. This was abundant especially on the latter host. The telial stage on *Sporobolus asper* was recorded in the provisional list as *Puccinia sydowiana* Diet., a binomial that had been earlier proposed by Zopf for another rust.

Puccinia muhlenbergiae Arth. & Hol. On *Muhlenbergia sylvatica*. Blue River.

ADDITIONAL SPECIES

Not previously reported as occurring in Wisconsin.

Peronospora phlogina Diet. & Hol. This was found in very small quantity, with oospores, on *Phlox divaricata* at Blue River.

Venturia gaultheriae Ell. & Ev. On *Gaultheria procumbens*. Camp Douglas.

Taphrina filicina Rostr. On *Cystopteris fragilis*. Brodhead.

A collection on leaves of *Acer saccharum* seedlings made at Sheboygan was taken in the field for *Gloeosporium saccharinum*. On examination, however, it proved to be a *Septoria* and one that does not agree with any species of

which I have knowledge. The following notes were made: On large dead leaf areas 2-5 cm. across which are reddish brown, becoming pale with age; pycnidia epiphyllous, scattered, depressed-globose, 70-130 μ in diameter, wall usually thick and black about the ostiole; sporules acicular, straight, long acuminate, continuous, 20-30 x 1-2 μ . On leaves of seedling *Acer saccharum*. Sheboygan, Wisconsin, August 26, 1926. For the purpose of filing in the herbarium this has been provisionally referred to *Septoria seminalis* Sacc. as *forma orthospora*. I have seen no specimens of this species which is said to occur on cotyledons of *Acer campestris* and to have falcate sporules. The status of this parasite awaits further information.

Septoria dodecatheonis n. sp. Spots dark olivaceous, varying from circular or angular 2-4 mm. in diameter to elongate 1 cm. in length, often confluent and with the death of intervening and surrounding leaf tissue forming considerable areas; pycnidia small, numerous, scattered, globose to ovoid or even flask-shaped, wall black, compact, ostiole more or less prominent, 50-80 μ in diameter; sporules hyaline, straight, 20-40 x 1-1 $\frac{1}{2}$ μ . On leaves of *Dodecatheon Meadia*. Blue River, Wisconsin, June 18, 1926. The material is not quite mature and the mature sporules are probably somewhat larger. The appearance under a hand lens suggests stromata of a Hyphale rather than pycnidia. [Collected in 1927 at Madison and New Glarus.]

Of a collection on Geum made at Sheboygan August 26, 1926, the following notes were made: Spots definite, circular or subcircular, olivaceous with a narrow darker border above, lighter below, 3-5 mm. in diameter, sometimes confluent, conidiophores fasciculate, hyaline, straight, curved or bent, sometimes denticulate near the apex, simple, continuous, often congested, 10-30 x 1-2 μ ; conidia hyaline, slender, straight, acute, continuous, 25-50 x 1 $\frac{1}{2}$ -2 $\frac{1}{2}$ μ . This has been referred to *Ramularia gei* (Fckl.) Lindau. The species is evidently a variable one ranging from an Ovularia to a Cercospora type.

In the provisional list all specimens of Aecidium on *Helianthus* were referred to *Puccinia helianthi* Schw. In *North American Flora* 7: 754, a Wisconsin specimen on

Helianthus was referred to *Nigredo junci* (Desm.) Arth. (*Uromyces junci* (Desm.) Tul.). This form appears to be not uncommon on Helianthus in Wisconsin but no uredinia or telia of *Uromyces junci* (Desm.) Tul. are known to occur in the state but *U. junci-tenuis* Syd. is common and *U. junci-effusi* Syd. is sometimes abundant.

Ramularia dispersa n. sp. Immaculate; conidiophores fasciculate, hyaline, straight, simple, continuous, 20-35 x 3μ ; conidia hyaline, catenulate, fusoid to cylindrical, straight, continuous, 10-23 x 2-3 μ . On *Napaea dioica*. Browntown, Wisconsin, September 22, 1926: The white tufts are widely scattered over the lower surface of the unmodified leaves. In this collection the leaves contain many holes apparently due to gnawing insects which suggests that the fungus may have been scattered by insects.

Aecidium trillii Burr. On *Trillium grandiflorum*. Balsam Lake.

Herbarium,
University of Wisconsin,
April, 1927.



NOTES ON PARASITIC FUNGI IN WISCONSIN. XVI

J. J. DAVIS

It is perhaps well to repeat that this series of notes is supplemental to a list of parasitic fungi in Wisconsin published in the Transactions of the Wisconsin Academy of Science, Arts and Letters 17²: 846-984. Names of hosts are according to Gray's New Manual of Botany, seventh edition.

Peronospora urticae (Lib.) DBy. was collected in 1883 at Kirkland (now Devils Lake) by Trelease and at La Crosse by Pammel. These localities are 80 miles apart. No further collections appear to have been made in America except a record by Harkness & Moore of its occurrence in California but there appears to be no specimen extant.

It has recently come to my attention that *Geranium maculatum* was recorded as a host of *Erysiphe polygoni* DC. in the Provisional List while the parasite is really *Sphaerotheca humuli* (DC.) Burr. While looking the matter up in the herbarium I found that the specimen of *Sphaerotheca humuli* (DC.) Burr. on *Geranium* in Ellis & Everhart *Fungi columbiani continued* 1438 was labeled *Erysiphe polygoni* DC.

Because of the previous use of the name Keithia for a genus of Labiate by Bentham Maire replaces Keithia Sacc. by Didymascella Sacc. & Maire and makes new combinations accordingly (*Bull. Soc. Nat. Hist. Afrique du Nord.* 18: 120 μ , Abstract in *Review of Applied Mycology* 7: 59.) Keithia appears to have been used as a generic name still earlier by Sprengel, applied to some phanerogamous plant.

Pycnidia of *Phyllosticta viticola* (B. & C.) Thuem. (*Ph. labruscae* Thuem.) occur in which the sporules are mostly 4-7 x 2-3 μ . This may be microconidial rather than immature.

In the 34th Report of the State Museum of Natural History (1881), p. 45, Peck described a leaf parasite of *Apocynum androsaemifolium* under the name *Septogloeum apocyni* n. sp. and gave figures of a spotted leaf and of sporules on Plate I, fig. 2 & 3. Because of the presence of a thin wall surrounding the hymenium this was transferred to *Stagonospora* in Transactions of the Wisconsin Academy of Science, Arts and Letters 19²: 699 (1919). In *Hedwigia* 58: 25 (1917) Bubak, apparently unaware of Peck's publication, described the parasite as *Dearnessia apocyni* n. gen. & n. sp. The thinness of the pycnidial wall and the presence of superficial hyphae hardly seem to be generic characters. Sydow, *Fungi exotici exs.* 749, represents the Fungus.

In the provisional list a parasite of *Gentiana andrewsii* was recorded under the name *Leptothyrium gentianaecolum* (DC.?) Baeumler. Wisconsin specimens were distributed in Ellis & Everhart *North American Fungi* 2766 labeled *Phyllosticta (Depazea) gentianaecola* (DC.). In Ellis & Everhart's *North American Phyllostictas* it was included under the name *Phyllosticta gentianaecola* with *Depazea gentianaecola* given as a synonym. In *North American Flora* 6: 30, it is *Phyllosticta gentianaecola* (DC.) Ellis & Ev. In "Notes" X, pp. 272-3 it was suggested that it might be *Asteroma gentianae* Fckl. In an attempt to clear the matter up material was sent to the European mycologist, Dr. F. Petrak, who thinks it to be distinct and suggests the new binomial *Asteromella andrewsii* nom. nov. The ascogenous state that seems to be connected with it being *Mycosphaerella andrewsii* Sacc. As stated in "Notes" X there is one collection on *Gentiana puberula*.

In July, 1927 a collection was made at Portage that appears to be a better developed state of the parasite that was described in *Trans. Wis. Acad.* 9: 99 under the name *Septoria brevispora* Ell. & Davis (*Syll. Fungorum* 18: 396). In this collection the spots become sordid white, except the peripheral portion, the pycnidia dark brown with a black ring around the pore and the sporules 15-30 x 2 $\frac{1}{2}$ -4 μ . On staining, a median division of the cytoplasm

appears. The host of the Portage collection was a coarse grass without fructification which may well be *Bromus ciliatus* or a cognate species. In the collections made at Racine, of which there are 4, development may have been arrested by death of the host tissues.

In a collection of *Septoria* on leaves of what is perhaps *Populus nigra* from Sauk City (Aug. 5, 1927) most of the spots become finally round, white and arid, 1-2 mm. in diameter. The sporules are bisepitate only the short ones having but one septum. This seems to be intermediate between *S. Populi* Desm. and *S. musiva* Pk. and is of interest in connection with the suggestion in "Notes" I, p. 83, of a single variable species.

A specimen from this collection was sent to Dr. F. Pettrak who identified it as *Septoria populi* Desm. and stated that *S. musiva* Pk. is a form of that species.

In a collection of *Septoria negundinis* E. & E. from Arena the pycnidia are effused over areas that sometimes retain the green color until full maturity of the parasite. Some of the sporules exceed 50μ in length. The hosts are door-yard trees.

A collection made at Carmel, California, by Mrs. Effie S. Spalding communicated by Dr. B. M. Duggar which I refer to this species shows sporules $20-38 \times 3-4\mu$, 3-septate.

In making comparison with specimens of *Septoria davisii* Sacc. in the Davis herbarium the following notes as to size of sporules were found on the packets: "33-40 x 2μ . Type of *Septoria canadensis* Ell. & Davis," "36-80 μ long," "30-70 x $2-3\mu$," "33-52 x $1\frac{1}{2}-2\mu$." In the specimen that was being compared they were $33-36 \times 2\mu$. The host appears to be what is now known as *Solidago altissima* L. The parasite is probably not distinct from *Septoria fumosa* Pk.

In addition to the typical form of *Septoria rudbeckiae* Ell. & Hals. *Rudbeckia laciniata* bears a form in which the spots are orbicular to angular, white and arid with a very narrow dark margin, 1-2 mm. in diameter, sometimes confluent. The sporules are straight, $35-70 \times 1\mu$.

Gloeosporium apocryptum Ell. & Ev. was described as having sporules 5-12 x 2½-5 μ . Wisconsin collections show sporules up to 17 x 7 μ . In germination on a slide dark "appressoria" were produced about 10 x 6 μ .

Dr. F. J. Seaver kindly compared *Tuberculina argillacea* Davis ("Notes" XI, p. 293) with *Gloeosporium rubi* Ell. & Ev. (*Journ. Mycol.* 4: 52) and found that they appear to be the same. It is not typical of either genus. The reference to *Tuberculina* was based largely on its apparent relation to *Caeoma*.

Dr. Petrak states that a Wisconsin specimen labeled *Ramularia uredinis* (Voss) Sacc. is *Ramularia rosea* (Fckl.) Sacc. (*Ann. Mycol.* 25: 222). It was noted in the 1st and 3d supplementary lists of parasitic Fungi of Wisconsin that it sometimes appeared on leaves of *Salix* on which no sori of *Melampsora* were seen. What appears to be the same organism has been collected on *Caeoma*-infected leaves of *Populus deltoides* as was recorded in "Notes" IV, p. 679. Typical *Ramularia rosea* (Voss) Sacc. is common in Wisconsin on leaves of various species of *Salix* not bearing *Melampsora*.

In the transactions of the Wisconsin Academy of Science Arts and Letters 16: 762-3 *Ramularia paulula* was published as a new species on *Elodes (Hypericum) virginica*. It was afterwards found that the host was probably *Lysimachia thyrsiflora* and the parasite *Ramularia lysimachiae* Thuem., hence it was omitted from the Provisional list.

In the description of *Cladosporium humile* ("Notes" V, 702) it was stated that the conidiophores are epiphyllous. They occur on the lower surface of the spots also.

The record of *Cercospora zebrina* Pass. on *Trifolium dubium* in "Notes" XII, p. 160 was an error. It should be *Cercospora medicaginis* Ell. & Ev. if that is distinct, on *Medicago lupulina*. The collection was made hastily at a junction point while changing trains.

While studying the germination of the spores of leaf smut of *Glyceria* Bauch found that the sporidia of *Ustilago longissima* (Sow.) Tul. were of two classes as shown

by their behavior in conjugation while those of the var. *macrospora* were of three kinds. (*Zeitschr. f. Botanik* 15: 241 *et seq.*) On morphological grounds Liro considered the variety specifically distinct, proposing for it the binomial *Ustilago davisi*. (*Usilagineen Finnlands* 1: 80). This illustrates the different conceptions of the limits of a group of organisms that shall be considered a species. When the varietal distinction was first made the host was known as *Glyceria fluitans*; later it was segregated under the name *G. septentrionalis*.

A specimen of *Entyloma compositarum* Farl. on *Lepachys pinnata* collected at New Glarus June 20, 1927 shows unusual development of conidia ranging up to $70 \times 2\mu$.

In "Notes" XIV record was made of the development of *Puccinia* on *Andropogon furcatus* in the greenhouse in the spring of 1925 using aeciospores of *Aecidium falcatae* Arth. on *Amphicarpa monoica* as the inoculum.

In 1926 similar infection was secured from *Aecidium xanthoxyli* Pk. except that the uredospores were of the *Puccinia pustulata* type. Record of this is made in "Notes" XV issued herewith.

In conversation with Dr. E. B. Mains he told me that he had once infected *Polygala Senega* with *Puccinia andropogonis* but that the return inoculation on *Andropogon* failed and he did not publish for that reason. In the spring of 1927 two lots of rusted *Andropogon furcatus* that had been overwintered out-doors were anchored in a locality where *Polygala Senega* was growing but where no *Aecidium* had been seen on it. One lot had been obtained at Blue River and about it no aecia appeared. The other lot came from Dill and around it *Aecidium* appeared on the *Polygala*. With these aecia *Andropogon furcatus* was infected in the greenhouse resulting in uredinia and a few telia. The uredospores were of the typical *P. andropogonis* type.

Sheldon reported that he had brought about development of *Uromyces* on *Sisyrinchium* by infection from aeciospores of *Aecidium houstoniatum* Schw. on *Houstonia caerulea*. He also reported that he had tried several times to inoculate *Sisyrinchium* with aeciospores from *Houstonia purpu-*

rea both in the field and in the greenhouse but without definite success (*Torreya* 9: 54-5). *Aecidium houstonianum* Schw. occurs in Wisconsin on *Houstonia longifolia* but no rust has been found on *Sisyrinchium* although it has been looked for in the vicinity of infected *Houstonia*. In June, 1927 an attempt was made to infect *Sisyrinchium* obtained from two sources with *Aecidium* on *Houstonia* but although the conditions appeared to be favorable no infection resulted.

In the *Preliminary List of Parasite Fungi of Wisconsin* by William Trelease (*Trans. Wisconsin Academy of Science Arts & Letters* 6 (188), *Uredo* sp. (No. 216) on *Mimulus ringens* and *Aecidium pentstemonis* Schw. (No. 240) on the same host were reported as having been collected at La Crosse by Pammel. I am informed that Dr. Pammel's specimens, which are in the herbarium of Iowa State College, have been examined by Dr. Arthur who concluded that the host is *Epilobium coloratum*, the *Uredo Pucciniastrum pustulatum* (Pers.) Diet. and the *Aecidium* that of *Puccinia peckii* (De Toni) Kell. The latter has not been recorded as occurring on *Epilobium* in Wisconsin.

ADDITIONAL HOSTS FOR WISCONSIN

It is customary to add each year another host for *Synchytrium* in Wisconsin. For 1927 it is *Steironema ciliatum* and the parasite is referred to *Synchytrium aureum* Schroet. In this collection which was made at Blue River, the wall surrounding the sorus is often very irregularly thickened. This may have been due to the character of the season which was very dry.

Albugo candida (Pers.) O. Kuntze
On *Cardamine rhomboidea*. Madison.

Spotting of the leaves of water cress, *Radicula nasturtium-aquaticum*, growing in the waters of springs emptying into lake Wingra at Madison due to *Cercospora nasturtii* Pass. is not uncommon. In 1927 however abundant leaf spotting occurred which was due to *Peronospora parasitica* (Pers.) Tul.

Sphaerotheca humuli (DC.) Burr.

On *Geum strictum*. Sauk City.

Erysiphe cichoracearum DC.

On *Lactuca spicata*. Madison.

Microsphaera alni (Wallr.) Wint. (*M. elevata* Burr.)

On *Catalpa* (cult.) Cudahy. A. C. Burrill.

Acanthostigma occidentale (E. & E.) Sacc.

Stylosporous state on *Artemisia ludoviciana*. Token Creek. The stylospores are about $5 \times 2\mu$.

Stagonospora intermixta (Cke.) Sacc.

On *Agrostis alba*. La Valle. In this collection the pycnidial wall is of uniform thickness, the 7-septate sporules $43-48 \times 3\frac{1}{2}\mu$.

Septoria caricinella Sacc. & Roum.

On *Carex straminea* and *C. Bebbii*. New Glarus.

Septoria violae West.

On *Viola blanda*. Hollandale.

Septoria lysimachiae West.

On *Lysimachia quadrifolia*. La Valle. Scanty and poorly developed in this collection.

Colletotrichum graminicolum (Ces.) Wilson.

On culms of *Cinna arundinacea*. Arena.

On *Sorghastrum nutans*. Browntown.

But few sporules in this collection. The spots are purple bordered.

Marssonina coronaria (Ell. & Davis) Davis. (*Marssonina coronariae* Sacc. & Dearn.)

On *Pyrus ioensis*. Trempealeau and Highland.

Ramularia decipiens Ell. & Ev.

On *Rumex obtusifolius*. Browntown.

Fusicladium effusum Wint. var. *carpineum* Ell. & Ev.

On *Carpinus caroliniana*. Hollandale.

[Demaree finds that the conidia of *Fusicladium effusum* Wint. on *Carya* are catenulate and refers the species to *Cladosporium* with a new description (*Journ. Ag'l Re-*

search 37: (86) The form on *Carpinus* appears to be of the same character.]

Cercospora helianthi Ell. & Ev.

On *Helianthus strumosus*. Browntown. In this collection the conidiophores are hypophylloous, tortuous, multi-septate, ranging up to 200μ in length.

Isariopsis albo-rosella Sacc.

On *Stellaria aquatica*. South Wayne and Gratiot. Abundant at the latter station but not well developed at the time of collection. It was thought to be *Graphiothecium pusillum* (Fckl.) Sacc. until septate conidia were found.

In 1911 *Puccinia graminis* Pers. was observed on a single plant in a colony of *Glyceria grandis* near Butternut in northern Wisconsin. In 1927 this experience was repeated at New Glarus in southern Wisconsin. At Blue River a plant of *Leersia virginica* was found bearing *Puccinia impatienti-elymi* Arth. (Klebahn) = *P. impatientis* Arth. = *P. elymi-impatientis* Davis. This rust is abundant in the locality on Elymus but in only the single instance has it been found on Leersia although 3 species of the genus occur there and it has been a favorite collecting ground in previous years. There appears to be no record of its occurrence on this host elsewhere. Such occurrences may lead one to surmise that development of a species on a new host may occasionally take place and that this may sometimes be followed by adaptation, physiological changes due to the new substratum resulting in isolation followed in time by morphological differentiation and the development of a new species.

Acerates floridana is recorded as an aecial host of *Dicaeoma jamesianum* (Pk.) Arth. = *Puccinia bartholomaei* Diet. in Wisconsin in *North American Flora* 7: 320.

Puccinia seymouriana Arth.

Aecia on leaves and stems of *Asclepias ovalifolia*. New Glarus.

Puccinia peckii (De Toni) Kell.

Aecia on *Oenothera rhombipetala*. Mazomanie.

Solidago graminifolia should be included in the list of aecial hosts of *Puccinia extensicola* Plowr. in Wisconsin.

Chrysomyxa pyrolae (Pers.) Diet.

Uredinia on *Pyrola americana*. Friendship.

Coleosporium solidaginis (Schw.) Thuem.

On *Callistephus chinensis* (cult.)

Oconto (A. C. Burrill)

ADDITIONAL SPECIES

Not hitherto recorded as occurring in Wisconsin.

Investigation of host relations of obligate fungous parasites has shown that they are usually adapted to the kind of host upon which they are found. That the adaptation may be relative rather than absolute has also been shown, and that it is not necessarily accompanied by morphological differentiation is well known. By some mycologists new species have been proposed based only upon adaptation to a particular species of host. The practice of considering these as physiological races seems the better one and hence they are not recorded in these notes in which the hosts have already been given.

Peronospora oxybaphi Ell. & Kell.

On *Oxybaphus nyctagineus*. Browntown and Brodhead along the railroad. The conidia range up to 30μ in length and 22μ in breadth and are ovate in outline.

At a station near Friendship a few plants of *Melampyrum lineare* were found, only 3 or 4 as I remember, and none were found elsewhere in that locality. On the young upper leaves of these plants was a parasite regarding which the following notes were made: Forming a sordid gray coating on the lower leaf surface; conidiphores $300-400\mu$ long, 3-4 times branched, usually dichotomously, but sometimes the branches are at an obtuse or even a right angle, ultimate branchlets short, straight, acute, divergent; conidia fuscous, elliptical, acute at base, $24-36 \times 20\mu$. No oöspores were found.

Plasmopara melampyri Bucholtz I know only from the description in Saccardo: *Sylloge Fungorum* 21: 861 but

the Wisconsin plant seems to be referable to that species. Bucholtz appears to have been in doubt as to whether it should be placed in *Peronospora* or *Plasmopara*. To the writer it furnishes additional evidence that they are congeneric and that the latter was given generic rank before the evidence was all in. As this parasite has apparently been found in the single locality in Russia and the very restricted station in Wisconsin only, one might suspect that it is well on the way toward extinction. However recrudescences have been known to occur in such cases.

[This was collected the following year at Radisson. As in the previous collection it was confined to the lower surface of the upper leaves and would escape detection when the hosts were observed from above as the infected leaves, at least at the time of collection, were not changed in appearance by the presence of the parasite. The germination of the conidia has not been observed and oöspores have not been seen.]

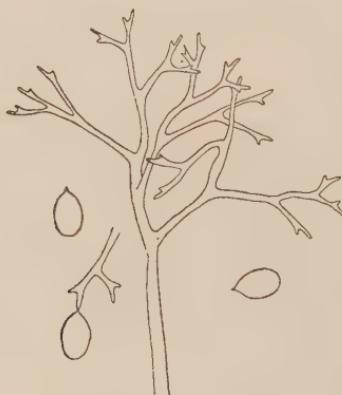


FIG. 1. A conidiophore and three conidia of *Plasmopara melampyri* Bucholtz. Drawn by E. M. Gilbert with the aid of camera lucida.

The lower surface of the older leaves of the same plants of the Friendship collection bore *Ramularia melampyri* Ell. & Dearn. I have not seen a specimen of *Fusidium melampyri* Rostr. but the description suggests that it is the same species as the one described by Ellis & Dearnness.

What has been known as *Ascochyta pisi* Lib. has been divided by Linford & Sprague into 2 species one retaining the name and the other a pycnidial state of *Mycosphaerella pinodes* (Berk. & Blox.) Stone with which the typical *Ascochyta pisi* Lib. is not connected. They also found a third form which they designated temporarily *Mycosphaerella pinodes* microform (?) (*Phytopath.* 17: 390-91.)

[For the "microform" the binomial *Ascochyta pinodella* n. sp. has been proposed by Leon K. Jones (N. Y. State Ag'l. Exp. Station, Geneva, Bull. 547, p. 10) and for the pycnidial stage of *Mycosphaerella pinodes*, *Ascochyta pinodes* (Berk. & Blox.) n. comb. (*loc. cit.* p. 4.)]

While examining leaves of *Anemone canadensis* for the presence of oöspores of *Plasmopara pygmaea* it was found that in addition to the oöspores there were present pycnidia about 100μ in diameter containing hyaline oblong sporules $18-30 \times 3-7\mu$ 1-2 septate. Whether or not this is *Stagonospora anemones* Pat. I do not know.

Septoria polygalae Pk.

On *Polygala Senega*. New Glarus.

This name was given by Peck to a species occurring on *Polygala pauciflora*. Subsequently he collected a form on *Polygala Senega* bearing Aecidium also to which he gave the name *Septoria consocia*. As described this differs from the former in its shorter sporules which otherwise are of the same character. On the Wisconsin collection there is no Aecidium and the sporules are intermediate in length (23-33 x $1\frac{1}{2}-1\mu$) as between the two descriptions.

Septoria calystegiae West.

On *Convolvulus arvensis*. Madison.

Septoria polemonii Thuem. (*S. polemoniicola* Ell. & Mart.)

On *Polemonium reptans*. Gratiot and Token Creek.

S. polemoniicola Ell. & Mart. appears to have been separated mostly because of the small white spots but European specimens bear similar spots. Ellis & Martin apparently knew von Thuemen's species from the description only.

While some kinds of plants are infected by various fungi others are seldom found to be attacked. In Wisconsin no

parasite had been seen on *Lithospermum*. In July 1927, however, a few spotted leaves of *L. canescens* were observed near Portage. The spots are dark brown, more conspicuous below, subangular, 1-3 mm. in diameter. There are small spore bodies, usually near the periphery of the spot on the upper surface and few in number bearing tufts of hyaline conidia $40-60 \times 2/3\mu$ which are usually curved, often strongly so. The better developed spore bodies appear to be imperfectly formed pycnidia. It seems possible that this was a chance infection by a *Septoria* that normally develops on another host. I do not now recall whether the infection was confined to a single plant but the small number of infected leaves suggests that it may have been. For the purpose of filing this has been labeled *Septoria lithospermi* nom. herb.

Colletotrichum trifolii Bain is reported as occurring in Wisconsin by John Monteith, Jr., in U. S. Department of Agriculture Technical Bulletin No. 28.

Gloeosporium achaeniicola Rostr.

On epicarp of *Heracleum lanatum*. Mineral Point. The type of this species was on fruit of *Pastinaca sativa*.

Cylindrosporium pimpinellae C. Massal. var. *pastinaceae* Sacc.

On *Pastinaca sativa*. Gratiot.

In this collection the conidia are mostly $60-70 \times 3-4\mu$ curved, tapering both ways from the middle, becoming 1-3 septate.

Didymaria puncta n. sp.

On elongate light brown to sordid white areas; conidio-phores borne on the outer aspect of globose brownish black tubercles, congested, hyaline varying from $15 \times 2-3\mu$ to obsolete; conidia apical, hyaline, straight, long fusoid, acute, $20-30 \times 3\mu$ developing a median septum. On stems and bracts of *Sisyrinchium campestre*. New Glarus, Wisconsin, June 17, 1927. The tubercles are closely spaced, $40-60\mu$ in diameter. The conidia fall away readily and it was not determined whether they are catenulate or not.

From collections on leaves of *Saxifraga pennsylvanica* made at Portage, June 6 and 8, 1927 the following notes were made: Spots circular, brown sometimes more or less tinged with purple, becoming cinereous with the development of conidia and often zonate above, uniformly brown below, 4-8 mm. in diameter; conidiophores arising from dark tuberculoid stromata, congested, hyaline, straight or somewhat flexuose above, often subulate, 10-30 x 2-4 μ ; conidia hyaline, filiform, straight or lax, 30-100 x 1-2 μ . I do not doubt that this is the species collected at Dover, Norway to which Rostrup gave the name *Cercospora saxifragae* which I know only from description. There is a discrepancy in the length of the conidiophores which are described as being long but that is a character that cannot be stressed in this group.

Of a collection on leaves of *Tanacetum vulgare* from a garden in Highland the following notes were made: Spots becoming definite and black; conidiophores amphigenous, hyaline, fasciculate, simple, mostly straight and continuous, 20-40 x 3-4 μ ; conidia hyaline, straight, cylindrical but usually with a slight taper, obtuse at each end, 24-43 x 3 $\frac{1}{2}$ -5 μ . On referring to the description of *Ramularia tanaceti* J. Lind in the *Sylloge Fungorum* the statement was met that the conidia are acute at each end. In Rabenhorst *Kryptogamenflora* Lindau gave a description which he stated was more complete than Lind's and resulted from examination of original material. This description is the same as the one in the *Sylloge* including the statement that the conidia are acute at each end. In the original description by Lind (*Ann. Mycol.* 3: 431), however, the conidia are described as being obtuse at both ends as they are in the Wisconsin collection. There seems to be no question of the identity of the Wisconsin parasite and *Ramularia tanaceti* J. Lind. The similarity in the names of the three mycologists Lind, Lindau and Lindroth sometimes leads to confusion. For instance in Oudemans' *Enumeratio Systematica Fungorum* this species is attributed to Lindroth.

Cercospora thaspiicola n. sp.

Spots pale alutaceous becoming sordid white, angular, limited by the veinlets, with a narrow brown border, 2-5 x

1-2 mm.; conidiophores amphigenous, fuligenous tinted, caespitose, straight with an oblique apex and a shoulder, simple, continuous, $35-50 \times 4-5\mu$; conidia hyaline, fusoid-cylindrical, obtuse, straight or slightly curved, 1-3 septate, $37-73 \times 4-6\mu$. On *Thaspium aureum*. South Wayne, Wisconsin, June 27, 1927. Ellis & Everhart, *North American Fungi* 2585 is labeled *Cercospora thaspiae* n. sp. On leaves of *Thaspium trifoliatum* Wilmington, Delaware, November 1889. A. Commons. Apparently no description was ever published. The specimen shows circular or sometimes angular brown spots which become white and arid with a brown border 1-2 mm. in diameter. The conidiophores are in small fascicles, erect or diverging, straight or but little flexuose, deep brown, pluri-septate, $50-100 \times 5-6\mu$. As one might expect of a specimen collected so late in the season and so long ago, no conidia were found. In Gray's Manual of Botany, edition 5, which was in use in 1889, *Zizia cordata* DC. was referred to *Thaspium trifoliatum* as var. *apterum* and it is a question as to whether N. A. F. 2585 is on *Thaspium* or *Zizia* and in the absence of conidia what its relation may be to *Cercospora ziziae* Ell. & Ev. It may easily be that collections of a species made in June and in November would show differences but there does not seem to be justification for stating that N. A. F. 2585 and the Wisconsin collection are conspecific.

Although *Puccinia muhlenbergiae* Arth. & Hol. has been known in Wisconsin no Aecidium on Malvaceae had been seen until 1927 when *Aecidium napaeae* Arth. & Hol. was collected on *Napaea dioica* at Gratiot, New Glarus, Brown-town and South Wayne. These localities are in southern Wisconsin. The host seems to be spreading along the railroads especially where they pass over low ground and are ballasted with cinders.

***Aecidium sparsum* n. sp.**

Pycnia hypophyllous, scattered, brown; aecia hypophyllous, scattered, $1/4-1/3$ mm. in diameter; peridium white, lacerate, the lobes reflexed and caducous; spores yellow globose, thin-walled, finely and sparsely verrucose, $18-22\mu$ in diameter. On *Galium tinctorium* on bottom lands of the

Wisconsin river opposite Sauk City, July 2, 1925 (Weber & Davis,) July 11, 1927. The distribution of the aecia suggests systemic infection but there is no distortion or discoloration of the host.

Herbarium,
University of Wisconsin,
April, 1928.

NOTES ON PARASITIC FUNGI IN WISCONSIN. XVII

J. J. DAVIS

H. Sydow has proposed that *Phacidium balsameae* Davis ("Notes" VIII, p. 424) be made the type of a new genus *Stegopezizella*. (*Ann. Mycol.* 22 : 392)

To the description of *Peziza (Mollisia) singularia* Pk., afterwards referred to *Pseudopeziza*, was added the suggestion "Perhaps a form of *Pseudopeziza ranunculi* Fckl." (35th Report, p. 142). This is doubtless the case and that is a form of *Fabraea ranunculi* (Fr.) Karst. Septate spores have been seen in Wisconsin material. The common host in Wisconsin is *Ranunculus pennsylvanicus* but it occurs also on *R. septentrionalis*.

Marsonia baptisiae E. & E. on *Baptisia leucantha*, founded on a specimen from Iowa, was published in the *Bulletin of the Torrey Botanical Club* 24: 291 [1897] with the statement that the conidia become "faintly uniseptate". In "Notes" II, p. 103, this was recorded as occurring in Wisconsin with the statement that "septation of the sporules seems doubtful". In "Notes" XIV p. 186 *Ascochyta baptisiae* n. sp. was described with conidia uniseptate or occasionally with 2 or 3 septa. In 1928 a collection was made at Mazomanie in which the sporules are predominantly 2-3 septate. Re-examination of the specimen referred to *Marssonina baptisiae* (E. & E.) shows that the sporules are borne in pycnidia with walls about two cells thick. It is evident that the three collections represent degrees of development of the same parasite. I have not seen an authentic specimen of *Marsonia baptisiae* E. & E., but the description indicates that it is the same as the Wisconsin species. I am therefore labeling all of the specimens *Stagonospora baptisiae* (E. & E.) n. comb.

A parasite of *Shepherdia canadensis* was recorded in "Notes" II, p. 105, under the name *Cylindrosporium shep-*

herdiae Sacc. After examination of a collection from Idaho Dearnness changed the name to *Septoria shepherdiae* (Sacc.) Dearn. (*Mycologia* 20: 238). With the Wisconsin record was a suggestion that this is close to *Septoria argyraea* Sacc.

In the 29th Report of the State Botanist of New York a fungus on living leaves of *Trillium erythrocarpum* was described under the name *Vermicularia concentrica* P. & C. n. sp. The description was followed by the statement that Judge Clinton had sent in a variety on *Viola rotundifolia*. In the *Sylloge Fungorum* 3: 232, Saccardo changed the name to *Vermicularia peckii* Sacc. and designated the form on *Viola* var. *violae-rotundifoliae*. In the Report of the State Botanist for 1919 the variety was raised to specific rank as *Vermicularia violae-rotundifoliae* (Sacc.) House. In the *Botanical Gazette* 26: 96-97 Miss Stoneman described and figured *Volutella violae* n. sp. on *Viola cucullata*. In the Wisconsin "Notes" XI, p. 297 *Colletotrichum violarum* n. sp. was recorded on *Viola scabriuscula*. This has since been found on other species of *Viola* in Wisconsin. Examination of authentic material from Dr. House and of Miss Stoneman's description and figures indicates that the Wisconsin species is not distinct and that all of them should be referred to *Colletotrichum* because of their acervulous character. I am therefore labeling them ***Colletotrichum violae-rotundifoliae* (Sacc.) n. comb.** This accords with the results of Miss Duke's investigation in which she found that *Vermicularia* is not distinct from *Colletotrichum* (*Trans. Brit. Mycol. Soc.* 13³). I quite agree with her that *Colletotrichum*, which was properly described, should be retained instead of *Vermicularia* as the name of the genus.

In "Notes" III, p. 263 a collection on *Streptopus roseus* was referred to *Vermicularia liliacearum* West. There are also Wisconsin specimens on *Uvularia grandiflora* (Nelson Dewey State Park and Maiden Rock), *Oakesia sessilifolia* (Plover and White Lake) and *Smilacina stellata* (Woodman). All of these are on leaf spots and I am now designating them ***Colletotrichum peckii* (Sacc.) n. comb.**

Of Ellis & Everhart *North American Fungi* 2778, *Vermicularia helianthi* E. & K. n. sp. on *Helianthus rigidus*,

Manhattan, Kan. autumn 1887, W. T. Swingle I have seen no description.

Colletotrichum helianthi Davis, "Notes" I, p. 88 is apparently the same parasite.

In a collection of *Cladosporium humile* Davis on *Acer saccharinum* the development is on the peripheral portion of *Rhytisma* spots sometimes extending on to the ascocarp. The collection was made at Sauk City September 6, 1928.

In the description of *Cercospora viciae* Ell. & Hol. (*Journ. Mycol.* 1: 5 & 39) the conidiophores are said to be "short, $25-30 \times 3-4 \mu$ ". The Wisconsin specimens that have been referred to this species bear conidiophores up to 80μ long and the conidia sometimes attain 70μ in length. The parasite is rather common on *Lathyrus venosus*, *L. ochroleucus* and to a less extent on *L. palustris* in the northern part of the state. There is but one specimen on *Vicia* (*V. caroliniana*) which is from southeastern Wisconsin and bears equally long conidiophores.

The smut of *Polygonum sagittatum* recorded in the provisional list under the name *Sphacelotheca hydropiperis* (Schum.) DBy. is separated from that species by Liro and given the name *Sphacelotheca granosa* Liro. He gives as a distinguishing character the more prominent verrucosity of the spore wall. (*Ustilagineen Finnlands* I: 148-150)

In one of the "Notes" reference was made to an Aecidium on *Linaria canadensis* with the suggestion that as the host is a Scrophulariaceae the Aecidium is probably connected with *Puccinia andropogonis* Schw. Attempts to infect *Andropogon furcatus* with the aeciospores in the greenhouse have failed, however, when the conditions appeared to be favorable for infection.

In June, 1928 plants of *Amphicarpa monoica* and *Polygala Senega* were exposed to infection from *Puccinia* on *Andropogon furcatus* in the greenhouse. Abundant aecia were produced on the *Polygala* but none on the *Amphicarpa*. The telia were obtained at New Glarus near *Polygala Senega* plants that had borne aecia earlier in the season. As far as the experiments have gone they suggest

that *Puccinia andropogonis* Schw. is specialized as to aecial hosts but perhaps not as to telial.

ADDITIONAL HOSTS

Peronospora candida Fckl. (*P. androsaces* Niessl). On *Androsace occidentalis*. On a hill opposite Prairie du Sac.

Plasmopara viticola (B. & C.) Berl. & De Toni. On *Vitis bicolor*. Platteville.

Claviceps purpurea (Fr.) Tul. Sclerotia on *Glyceria borealis*. Haugen.

Phyllachora graminis panici Shear. On *Panicum tennesseense*. Sauk County.

Septoria bromi Sacc. On *Bromus incanus*. Couderay. In this collection the more or less depressed pycnidia are $100-165 \times 60-100\mu$, the sporules filiform, straight or but little curved, $37-60 \times 1-1\frac{1}{2}\mu$.

Septoria astragali Rob. On *Vicia americana*. Radisson. In this collection the pycnidia are very imperfect and the sporules grow out to a length of $120-200\mu$ resembling *Cylindrosporium*. This appears to be but the second collection in the state, the first having been reported by Trelease in 1884.

Of a collection on leaves of *Solidago altissima* made at Mazomanie, Sept. 20, 1928 the following notes were made: Spots subcircular, brown becoming cinereous above, 3-5 mm. in diameter, forming large areas through death of the intervening tissue; pycnidia epiphyllous, not prominent, succineous, globose, wall thin, of thin flat polygonal cells, $80-100\mu$ in diameter; sporules hyaline, straight, cylindrical with rounded ends, developing a median septum, $20-27 \times 6-7\mu$. Shorter continuous sporules are assumed to be immature. This is referred to *Ascochyta compositarum* Davis (*Trans. Wis. Acad.* 19²: 700).

A collection of the aecial stage of *Puccinia bartholomaei* Diet. on *Acerates longifolia* made by Pammel at La Crosse in 1883 appears to be the only one of that stage that has been made in Wisconsin. [This was collected in 1929 on *Acerates lanuginosa* near Prairie du Sac.]

Puccinia rubigo-vera (DC.) Wint. (*P. elymi* West., *P. agropyri* E. & E.). On *Bromus incanus*. Couderay. In this collection the sori are epiphyllous and small and most of the teliospores distorted.

Sclerotium deciduum Davis. On *Bidens frondosa*. Radisson.

ADDITIONAL SPECIES

Dothichloe atramentaria (B. & C.) Atk.

On culms of *Calamagrostis canadensis* in a cranberry marsh at Cranmoor (E. E. Honey).

Phyllosticta limitata Pk.

On *Pyrus Malus*. Lancaster. (V. H. Young & J. J. Davis.)

Phleospora mori (Lev.) Sacc.

On *Morus alba*. Madison. In all of the specimens of this parasite that I have seen the conidia are borne externally on a stroma of subcuticular origin and they might be referred to *Cylindrosporium*.

In August 1928 small collections were made at Platteville and Shullsburg of a parasite on leaves of *Abutilon Theophrasti* from which the following notes were made: Spots circular, alutaceous with a dark border, alike on both surfaces of the leaf; when young 1-3 mm. in diameter, with maturity becoming more irregular in outline, up to 6 mm. in length and becoming lacerate; pycnidia epiphyllous, depressed-globose, variable in size up to 200 μ in diameter with a black bordered pore up to 30 μ across; sporules hyaline, straight, continuous, 6-16 \times 2-3 $\frac{1}{2}\mu$. It may be that this is *Ascochyta abutilonis* Hollos, in which the septation of the sporules is said to come late, of which I have not seen an authentic specimen.

Leptostroma pinastri Desm.

On *Pinus Banksiana*. Camp Douglas.

Sphaceloma symphoricarpi Barrus & Horsfall. (*Phytopath.* 18:799.)

On *Symporicarpos racemosus* (Cult.). Madison. The spots are abundant on the fruit but acervuli are rare.

The preservation of specimens of the more delicate Hyphales is often unsatisfactory because of the falling away of the conidia and to a much less extent, the conidiophores. When on flat leaves and carefully treated the pressure tends to hold them in place and the detached ones do not wander far. From cylindrical surfaces, however, they disappear. This is by way of apology for calling attention to two species of which the material in hand leaves something to be desired.

Cercospora eleocharidis n. sp.

Globose, black, subepidermal, stromatoid bodies which sometimes extend into the epidermis from which spring fascicles of fuligenous fertile hyphae which reach the surface and usually extend $3-15\mu$ beyond; conidia apical, hyaline, narrow cylindrical, straight or somewhat curved, $30-70 \times 2\mu$. On more or less extensive dying and dead areas on culms of *Eleocharis palustris*. Brill, Wisconsin, July 23, 1928. This has been observed in Wisconsin for a number of years but the collections have hitherto been discarded when they came from the press because the conidia had fallen away.

Cercospora junci n. sp.

Black, scattered, intraepidermal, stromatoid bases $20-30\mu$ wide; conidiophores fuligenous tinted, nodulose, $15-30 \times 3-4\mu$; conidia subolivaceous, obclavate-cylindrical, acute, straight, $60-75 \times 4-5\mu$. On dying and dead areas or entire leaves of *Juncus brevicaudatus*. Brill, Wisconsin, July 23, 1928.

Cercospora setariae Atk.

On *Setaria glauca*. Browntown.

Cercospora parvimaculans n. sp.

Spots brown, angular, $1\frac{1}{2}-1\frac{1}{2}$ mm., often confluent and sometimes with a white center on the upper surface; conidiophores in small scattered fascicles or solitary, hypophylloous, more or less fuligenous, becoming tortuous, denticulate, and septate, $50-100 \times 3-5\mu$; conidia subhyaline, straight or curved, cylindric-obclavate to flagelliform, $100-180 \times 4-6\mu$. On leaves of *Solidago serotina*. Sauk City,

Wisconsin, September 6, 1928, type. Other collections are from Lone Rock, Blue River and Wauzeka July and August 1921, but no description was published.

Cercospora silphii Ell. & Ev.

On *Silphium laciniatum*, Shullsburg. *Silphium terebinthinaceum*, Madison. In these collections the spots are purplish-brown to black and the tufts inconspicuous. The conidiophores are often shorter than those of the type as described. A form on the former host was designated var. *laciniatae* by Tehon & Daniels (*Mycologia* 19: 128).

Coleosporium terebinthinaceae (Schw.) Arth.

Uredinia and a few telia on *Silphium perfoliatum*. Lancaster. In this collection the uredospores are $23-40\mu$ in length. That this species is a permanent member of the Wisconsin flora is questionable.

Uromyces alopecuri Seym.

On *Alopecurus geniculatus aristulatus*. Haugen.

Puccinia physostegiae Pk. & Cl.

On *Physostegia parviflora*. Abundant at a station in the bottom lands opposite Sauk City in 1928 attacking especially the upper leaves and the inflorescence, destroying the flowers.

While the fungous growths on "honey dew" on leaf surfaces are not parasites their effects are probably ill. An interesting form that occurs in Wisconsin on leaves of various plants is apparently the one to which Woronochin gave the name *Sclerotiomycetes colchicus* (*Ann. Mycol.* 24: 284). The orbicular flattened sclerotia strongly resemble perithecia.

Herbarium,
University of Wisconsin,
April, 1929.

INDEX TO PARASITES AND HOSTS REFERRED TO
IN NOTES XV, XVI, XVII

The names of Fungi are in italics.

Abutilon Theophrasti, 299
Acanthostigma occidentale (E. & E.) Sacc., 285
Acer saccharinum, 297
Acer saccharum, 275
Acerates floridana, 286
Acerates lanuginosa, 298
Acerates longifolia, 298
Aecidium falcatae Arth., 272, 283
Aecidium houstoniatum Schw., 283, 284
Aecidium napaeae Arth. & Hol., 292
Aecidium pentstemonis, 284
Aecidium sparsum n. sp., 292
Aecidium trillii Burr., 277
Aecidium verbenicolum E. & K., 275
Aecidium xanthoxylis Pk., 272, 283
Agrostis alba, 285
Albugo candida (Pers.) O. K., 284
Alopecurus geniculatus aristulatus, 301
Ambrosia psilostachya, 274
Ambrosia trifida, 274
Amphicarpa monoica, 272, 283, 297
Andropogon furcatus, 272, 283, 297
Androsace occidentalis, 298
Anemone canadensis, 289
Anemone virginiana, 273
Apocynum androsaemifolium, 280
Artemisia ludoviciana, 273, 285
Asclepias ovalifolia, 286
Ascochyta abutilonis Hollos, 299
Ascochyta baptisiae Davis, 295
Ascochyta compositarum Davis, 298
Ascochyta pinodella L. K. Jones, 289
Ascochyta pinodes (Berk. & Blox.) L. K. Jones, 289
Ascochyta pisí Lib., 289
Ascochyta wisconsina Davis, 269
Aster sagittifolius, 274
Aster Shortii, 273
Aster gentianae Fckl., 280
Asteromella andrewsii Petr., 280
Baptisia leucantha, 295
Barbarea stricta, 271
Bidens connata, 274
Bidens frondosa, 299
Bidens vulgaris, 274
Bromus ciliatus, 281
Bromus incanus, 298, 299
Calamagrostis canadensis, 299
Callistephus chinensis, 287
Cardamine rhomboidea, 284
Carex Bebbii, 285
Carex folliculata, 274
Carex straminea, 285
Carpinus caroliniana, 285
Catalpa, 285
Cercoseptoria crataegi n. comb., 271
Cercospora armoraciae Sacc., 271
Cercospora caricina Ell. & Dearn., 274
Cercospora cheiranthi, 271
Cercospora cruciferarum E. & E., 271
Cercospora eleocharidis n. sp., 300
Cercospora ferruginea Fckl., 274
Cercospora flagellifera Atk., 271
Cercospora helianthi E. & E., 286
Cercospora junci n. sp., 300
Cercospora latens E. & E., 272
Cercospora lespedezae Ell. & Dearn., 272
Cercospora medicaginis E. & E., 282
Cercospora nasturtii Pass., 271, 284
Cercospora nasturtii barbareae Sacc., 271
Cercospora parvimaculans n. sp., 300
Cercospora racemosa E. & M., 274
Cercospora setariae Atk., 300
Cercospora silphii E. & E., 301
Cercospora thaspis E. & E., 292
Cercospora thaspicola n. sp., 291
Cercospora umbrata Ell. & Hol., 274
Cercospora viciae Ell. & Hol., 297
Cercospora viminei Tehon., 274
Cercospora ziziae E. & E., 292
Cercosporella mirabilis Pk., 271
Cercosporella pyrina E. & E., 274
Cercosporella saxifragae Rostr., 291
Chrysomyxa pyrolae (Pers.) Diet., 287
Cinna arundinaceae, 285
Cladosporium effusum (Wint.) Demaree, 285
Cladosporium humile Davis, 282, 297
Claviceps purpurea (Fr.) Tul., 298
Coleosporium solidaginis (Schw.) Thuem., 287
Coleosporium terebinthinae (Schw.) Arth., 301
Colletotrichum graminicolum (Ces.) Wilson, 285
Colletotrichum helianthi Davis, 270, 297
Colletotrichum peckii (Sacc.) n. comb., 296
Colletotrichum trifolii Bain., 290
Colletotrichum violae e-rotundifoliae (Sacc.) n. comb., 296
Colletotrichum violarum Davis, 296
Convolvulus arvensis, 289
Cylindrosporium crataegi E. & E., 271

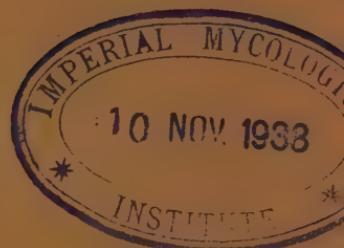
Cylindrosporium fraxini (Ell. & Kell.) Ell. & Ev., 270
Cylindrosporium pimpinellae pastinaceae Sacc., 290
Cylindrosporium shepherdiae Sacc., 295-6
Cystopteris fragilis, 275
Dearnnessia apocyni Bubak, 280
Dicaeoma jamesiana (Pk.) Arth., 286
Didymaria puncta n. sp., 290
Didymascella Sacc. & Maire, 279
Dodecatheon Meadia, 276
Dothichloe atramentaria (B. & C.) Atk., 299
Eleocharis palustris, 300
Entyloma compositarum Farl., 283
Epilobium coloratum, 284
Erysiphe cichoracearum DC., 273, 285
Erysiphe polygoni DC., 279
Eupatorium sessilifolium, 273
Fabraea ranunculi (Fr.) Karst., 295
Fraxinus oregana, 270
Fusicladium effusum carpineum E. & E., 285
Fusidium melampyri Rostr., 288
Galium tinctorium, 292
Gaultheria procumbens, 275
Gaura biennis, 275
Gentiana Andrewsii, 280
Gentiana puberula, 280
Geranium maculatum, 279
Geum, 276
Geum strictum, 285
Gloeosporium achaeniicola Rostr., 290
Gloeosporium apocryptum E. & E., 282
Gloeosporium niveum Davis, 270
Gloeosporium rubi E. & E., 282
Glyceria borealis, 298
Glyceria fluitans, 283
Glyceria grandis, 286
Glyceria septentrionalis, 283
Helianthus, 270, 276
Helianthus rigidus, 270
Helianthus strumosus, 286
Heracleum lanatum, 290
Houstonia caerulea, 283
Houstonia longifolia, 284
Houstonia purpurea, 283
Isariopsis albo-rosella Sacc., 286
Juncus brevicaudatus, 300
Keithia, 279
Lactuca spicata, 285
Lathyrus ochroleucus, 297
Lathyrus palustris, 297
Lathyrus venosus, 297
Leersia virginica, 286
Lepachys pinnata, 283
Leptostroma pinastri Desm., 299
Leptothyrium gentianaecolum (DC.?) Baeumler, 280
Lespedeza capitata, 271
Linaria canadensis, 297
Lithospermum canescens, 290
Lysimachia quadrifolia, 285
Marsonia baptisiae E. & E., 295
Marsonia coronariae Sacc. & Dearn., 285
Marssonina coronaria (Ell. & Davis) Davis, 285
Medicago lupulina, 282
Melampyrum lineare, 287
Melilotus alba, 273
Microsphaera alni (Wallr.) Wint., 285
Microsphaera elevata Burr., 285
Mimulus ringens, 284
Morus alba, 299
Muhlenbergia sylvatica, 275
Mycosphaerella andrewsii Sacc., 280
Mycosphaerella pinodes (Berk. & Blox.) Stone, 289
Napaea dioica, 277, 292
Oakesia sessilifolia, 296
Oenothera rhombipetala, 286
Oxalis corniculata, 272
Oxalis cymosa ? 272
Oxybaphus nyctagineus, 287
Panicum tennesseense, 298
Pastinaca sativa, 290
Peronospora androsace Niessl, 298
Peronospora candida Fckl., 298
Peronospora ficariae Tul., 273
Peronospora oxybaphi E. & K., 287
Peronospora parasitica (Pers.) Tul., 284
Peronospora phlogina Diet. & Hol., 275
Peronospora urticae (Lib.) DBy., 279
Peziza (Mollisia) singularia Pk., 295
Phacidium balsameae Davis, 295
Phleospora mori (Lev.) Sacc., 299
Phleospora oxyacanthae (Kze. & Schm.), 271
Phlox divaricata, 275
Phragmidium potentillae-canadensis Diet., 272
Phylloachora graminis panici Shear., 298
Phyllosticta decidua E. & K., 273
Phyllosticta gentianaecola (DC.) E. & E., 280
Phyllosticta iridis E. & M., 269
Phyllosticta labruscae Thuem., 279
Phyllosticta limitata Pk., 299
Phyllosticta viticola (B. & C.) Thuem., 279
Physostegia parviflora, 301
Pinus Banksiana, 299
Plasmopara melampyri Bucholtz, 287-8
Plasmopara pygmaea (Ung.) Schroet., 289

Plasmopara viticola (B. & C.) Berl. & De Toni, 298
Polemonium reptans, 289
Polygona pauciflora, 289
Polygala Senega, 283, 289, 297
Polygonum sagittatum, 297
Populus deltoides, 282
Populus nigra, 281
Potentilla canadensis, 272
Pseudopeziza medicaginis (Lib.) Sacc., 273
Pseudopeziza ranunculi Fckl., 295
Pseudopeziza singularis Pk., 295
Psoralea argophylla, 272
Puccinia agropyri, E. & E., 299
Puccinia andropogonis Schw., 283, 297-8
Puccinia bartholomaei Diet., 286, 298
Puccinia elymi, West., 299
Puccinia extensicola Flwr., 287
Puccinia graminis Pers., 286
Puccinia helianthi Schw., 276
Puccinia impatienti-elymi Arth., 286
Puccinia muhlenbergiae Arth. & Hol., 275, 292
Puccinia peckii (De Toni) Kell., 284, 286
Puccinia physostegiae Pk. & Cl., 301
Puccinia pustulata Arth., 272, 283
Puccinia rubigo-vera (DC.) Wint., 299
Puccinia seymouriana Arth., 286
Puccinia sorghi Schw., 272
Puccinia sydowiana Diet., 275
Puccinia vilfae Arth. & Hol., 275
Pucciniastrum pustulatum (Pers.) Diet., 284
Pyrola americana, 287
Pyrus ioensis, 274, 285
Pyrus Malus, 299
Radicula Nasturtium-aquaticum, 284
Ramularia decipiens E. & E., 285
Ramularia dispersa n. sp., 277
Ramularia gei (Fckl.) Lindau, 276
Ramularia melampyri Ell. & Dearn., 288
Ramularia rosea (Fckl.) Sacc., 282
Ramularia tanaceti J. Lind., 291
Ramularia uredinis (Voss) Sacc., 282
Ramularia virgaureae Thuem., 274
Ranunculus abortivus, 273
Ranunculus pennsylvanicus, 295
Ranunculus septentrionalis, 295
Rudbeckia laciniata, 281
Rumex obtusifolius, 285
Sambucus canadensis, 269
Saxifraga pennsylvanica, 291
Sclerotiomycetes colchicus Woronochin, 301
Sclerotium deciduum Davis, 299
Septogloeum apocyni Pk., 280
Septogloeum fraxini Hark., 270
Septoria anemones Desm., 273
Septoria argyraea Sacc., 296
Septoria astragali Rob., 298
Septoria atropurpurea Pk., 274
Septoria brevispora Ell. & Davis, 280
Septoria bromi Sacc., 298
Septoria calystegiae West., 289
Septoria canadensis Ell. & Davis, 281
Septoria caricinella Sacc. & Roum., 285
Septoria consocia Pk., 289
Septoria davisii Sacc., 281
Septoria dodecatheonis n. sp., 276
Septoria fumosa, Pk., 281
Septoria lysimachiae West., 285
Septoria musiva Pk., 281
Septoria negundinis E. & E., 281
Septoria pachyspora Ell. & Hol., 269
Septoria paupera Ellis, 270
Septoria polemonii Thuem., 289
Septoria polemoniicola E. & M., 289
Septoria polygalae Pk., 289
Septoria populi Desm., 281
Septoria rudbeckiae Ell. & Hals., 281
Septoria seminalis Sacc., 276
Septoria shepherdiae (Sacc.) Dearn., 296
Septoria sisymbrii Ellis, 271
Septoria solidagincola Pk., 273
Septoria violae West., 285
Setaria glauca, 300
Shepherdia canadensis, 295
Silphium laciniatum, 301
Silphium perfoliatum, 301
Silphium terebinthinaceum, 301
Sisyrinchium, 283
Sisyrinchium campestre, 290
Smilacina stellata, 296
Solidago altissima, 281, 298
Solidago graminifolia, 287
Solidago serotina, 300
Sorghastrum nutans, 285
Sphaceloma symphoricarpi Barrus & Horsfall, 299
Sphacelotheca granosa Liro, 297
Sphacelotheca hydropiperis (Schum.) D By., 297
Sphaerotheca humuli (DC.) Burr., 279, 285
Sporobolus asper, 275
Stagonospora anemones Pat., 289
Stagonospora apocyni (Pk.) Davis, 280
Stagonospora baptisiae (E. & E.) n. comb., 295
Stagonospora intermixta (Cke.) Sacc., 285
Stegopezizella, 295
Steironema ciliatum, 284
Stellaria aquatica, 286

Streptopus roseus, 296
Syphoricarpos racemosus, 299
Synchytrium aureum Schroet., 284
Tanacetum vulgare, 291
Taphrina filicina Rostr., 275
Taphrina hiratsukae Nishida, 269
Taphrina struthiopteridis Nishida, 269
Thaspium aureum, 292
Thaspium trifoliatum, 292
Trillium erythrocarpum, 296
Trillium grandiflorum, 277
Tuberculina argillacea Davis, 282
Uromyces alopecuri Seym., 301
Uromyces junci (Desm.) Tul., 277
Uromyces junci-effusus Syd., 277
Uromyces junci-tenuis Syd., 277
Uromyces plumbarius Pk., 275
Ustilago davisi Liro, 283
Ustilago longissima (Sow.) Tul., 282
Uvularia grandiflora, 296
Venturia gaultheriae E. & E., 275
Verbena stricta, 275
Verbena urticafolia, 275
Vermicularia concentrica P. & C., 296
Vermicularia helianthi E. & K., 270, 296
Vermicularia liliacearum West., 296
Vermicularia peckii Sacc., 296
Vermicularia peckii var. *violae-rotundifoliae* Sacc., 296
Vermicularia violae-rotundifoliae (Sacc.) House, 296
Vicia americana, 298
Vicia caroliniana, 297
Viola blanda, 285
Viola cucullata, 296
Viola rotundifolia, 296
Viola scabriuscula, 296
Volutella violae Stoneman, 296
Vitis bicolor, 298
Zanthoxylum americanum, 272

NOTES OF PARASITIC FUNGI
IN WISCONSIN
XVIII

BY J. J. DAVIS



REPRINTED FROM THE TRANSACTIONS OF THE WISCONSIN ACADEMY
OF SCIENCES, ARTS AND LETTERS, VOL. XXVI.

Issued May, 1931

NOTES ON PARASITIC FUNGI IN WISCONSIN. XVIII.

J. J. DAVIS

Reference has been made to the occurrence of *Phyllachora* on *Andropogon furcatus* in Wisconsin which had been seen in an immature condition only. A specimen on old rusted leaves of *Andropogon furcatus* from Avoca May 28, 1929 indicates that it is not morphologically distinct from *Phyllachora graminis* (Pers.) Fckl. The asci are $65-80 \times 8-10\mu$ and the spores $7-11 \times 7\mu$. It is sometimes abundant on this host.

For the parasite described under the binomial *Gloeosporium balsameum* in "Notes" VII, p. 409, the genus *Rhabdogloeopsis* has been proposed by Petrak (*Ann. Mycol.* 23: 52). Branching of the conidiophores and more than one conidium at the apex were not shown in the figure or indicated in the description. This was searched for in the type locality in 1929 without success, but it was found at Bailey's Harbor.

A collection on leaves of *Aquilegia canadensis* from Sturgeon Bay, July 26, 1929 shows reddish brown spots $1\frac{1}{2}-2$ cm. long in the direction of the veins, about one-half as wide, paler on the lower surface; pycnidia succineous, globose, more or less depressed, $100-150\mu$ in diameter; sporules hyaline, straight $4-7 \times 1\frac{1}{2}-3\mu$. This is probably a microconidial or immature state of *Ascochyta aquilegiae* (Rabh.) Hoehn. which is a member of the group on *Actaea*, *Thalictrum* and *Clematis* referred to in "Notes" V, p. 298. The description of *Phyllosticta aquilegiae* Tehon & Daniels (*Mycologia* 17: 241) suggests that it may be a further development of the same parasite.

In the *Bulletin of the Torrey Botanical Club* 27: 572 (1900), *Phyllosticta similispora* Ell. & Davis was published as a new species based upon material on *Solidago rigida* from Wisconsin. In *Annales Mycologici* 10: 312 (1912), *Leptothyrium tumidulum* Sacc. n. sp. was published based upon material on *Solidago rigida* sent from Ontario by Dearnness. The former was distributed in *Fungi Columbiani* Shear 1446, the latter in *Fungi Columbiani* Bartholomew 4637. Examination of authentic material indicates that these are conspecific. The pycnidia usually

develop on the upper leaf surface and are prominent, varying in shape from plano-convex to hemispherical to obtusely conical. When they develop on the lower surface however, as they sometimes do, they push into the mesophyll and are globose. The hymenium seems to be continuous except for the ostiole. The specific name, *similispora*, was suggested by the similarity of the sporules to those of *Phyllosticta sphaeropsispora* Ell. & Ev. on *Solidago confinis* in southern California which is said to differ in the character of the spots. A closely allied form is *Phyllosticta astericola* Ell. & Ev. which occurs in Wisconsin on *Aster umbellatus* developing similar pycnidia and sporules.

For several years *Cylindrosporium tradescantiae* Ell. & Kell. has been labeled *Septoria tradescantiae* (E. & K.) n. comb. in the herbarium because the sporules are formed in definite pycnidia.

A specimen on *Aster* (paniculatus?) collected May 18, 1929 bears sporules some of which exceed 80μ in length but it is referred to *Septoria astericola* Ell. & Ev. because they are but about 1μ in diameter. This species develops in spring (May, June), *S. atropurpurea* Pk. in summer.

Septoria nolitangeris Gerard usually develops in Wisconsin on immarginate spots but slightly paler than the leaf. It may be that the spots become typical later. It occurs on cotyledons as well as on foliage leaves. Immature perithecia are found in some of the specimens. The character of the spots probably depends upon the amount of light received.

In the *Journal of Mycology* 6: 34 (1890) Ellis & Halstead described *Gloeosporium cladosporioides* n.s. on *Hypericum mutilum* from a New Jersey collection. In this description is the sentence "Hyphae fasciculate, continuous, toothed above, hyaline becoming brown". At that time the word hyphae, contraction of fertile hyphae, was used to designate what are now called conidiophores. The description indicates that the parasite differs from *Gloeosporium* as that genus is now understood. Specimens of this were issued in Ellis & Everhart *North American Fungi* 2438. In *Some Fungi from Alabama* (*Bulletin of Cornell University (Science)* 3: 39 (1897) Atkinson described *Cladosporium gloeosporioides* n. sp. based on a collection made by himself on *Ascyrum stans* and one on "*Hypericum mutilum*, Sept. 1891 (Duggar)". Following the description is

the statement "Very different from *Gloeosporium cladosporioides*". In *Bulletin of the Alabama Experiment Station* No. 80, p. 160 Underwood & Earle recorded *Colletotrichum cladosporioides* (E. & E.) Atkinson and cited Lee [county], 9, 1891 (Duggar). In the list of Fungi contributed by Earle to Charles Mohr's *Plant Life of Alabama (Contributions from the U. S. National Herbarium 6, (1901))* *Cladosporium gloeosporioides* Atkinson is recorded with references to the same collections that were cited by Atkinson in his description of the species. This record is on p. 238 and on p. 250 appears the entry *Colletotrichum cladosporioides* (E. & E.) Atkinson, Ala. Bull. 160 "On *Hypericum mutilum*, Lee county, September, 1891 (Duggar)". Atkinson apparently made no publication himself of this binomial. The inference to be drawn is that he later considered his *Cladosporium gloeosporioides* to be a *Colletotrichum*. For the insertion of (E. & E.) I cannot account unless it was an error for Ell. & Hals. and that he had concluded that the *Gloeosporium cladosporioides* and the *Colletotrichum* were conspecific.

In 1912 collections were made at Wisconsin Rapids (Peltier) and Madison on *Hypericum virginicum* that were recorded in the Wisconsin "Notes" I, pp. 91-2, under the name *Cladosporium gloeosporioides* Atk. with the suggestion that it might be conspecific with *Gloeosporium cladosporioides* Ell. & Hals. Specimens from Madison were issued in Sydow *Fungi exotici exsiccati 99* with the Ellis & Halsted binomial given as a synonym on the label. Specimens from London, Canada, collected by Dearnness were issued in Bartholomew *Fungi Columbiani 2416* under the same name.

That the hyaline, continuous conidia are not characters of *Cladosporium* as that genus is now understood is evident. Why it was referred to *Colletotrichum* by Atkinson was a puzzle until it was noticed that in some of the tufts there were conidia on short, hyaline, delicate basidia as well as on the long dark conidiophores. As the conidia usually fall from the conidiophores in water such a mount might readily be taken for *Colletotrichum*. In the Wisconsin specimens the conidiophores are usually straight and rigid and resemble the setae of *Colletotrichum*. It does not seem likely that Atkinson intended to refer this to *Colletotrichum gloeosporioides* Penzig. In addition to the

collections referred to above are one each from Cameron and Dexterville, Wisconsin, but it is perhaps better to wait until more material is available before assigning this parasite to the polymorphous genus *Cercospora*. *Cercospora hyperici* Tehon & Daniels [*Mycologia* 19 : 127-8, (1927)] on *Hypericum adpressum* in Illinois I have not seen, but the shorter conidiophores and longer, sometimes septate, conidia appear to separate it.

In *Annals of the Missouri Botanical Garden* 16: 42 Miss Lieneman called attention to the fact that *Cercospora molluginis* Davis "Notes" X p. 285 is antedated by *C. molluginis* Hals. and proposed *Cercospora molluginicola* nom. nov. for the former. The variation in conidia in this genus is such as to make it doubtful that they are distinct.

The parasite found on nursery plants of *Amorpha fruticosa* in Iowa and recorded and figured in *The Fungi of Iowa Parasitic on Plants*, No. 206, as *Cylindrosporium passaloroides* (Wint.) comb. nov. seems to be quite different from *Cercospora passaloroides* Wint., which is a true *Cercospora* as clearly indicated in Winter's description and shown by Ellis & Everhart, *North American Fungi* 1999, Bartholomew *Fungi Columbiani* 3512 and 13 Wisconsin specimens in the herbarium of the University of Wisconsin. The hyphae from which the conidiophores of the *Cercospora* spring are sometimes, in part, superficial.

Cercospora viticola (Ces.) Sacc. has been connected by Higgins with an ascigerous state which he has described and named *Mycosphaerella personata* n. sp. (*Am. Journ. Bot.* 16: 295.)

Of a collection of a parasite that occurs on *Halenia deflexa* in Wisconsin and that has been referred to *Cercospora gentianicola* Ell. & Ev. the following notes were made: spots indefinite or none; conidiophores amphigenous, subfuliginous, borne on black stromatic tubercles, $7-20 \times 3-4\mu$; conidia hyaline, flagelliform, straight or curved, 2-4 septate, $50-90 \times 3-4\frac{1}{2}\mu$. On the upper surface of the leaves are what appear to be young perithecia which are black, somewhat dendritic in distribution, giving an appearance that reminds one of *Asteroma*.

From a collection on leaves of *Cephalanthus occidentalis* made on the bottom lands along the Wisconsin river Oct. 2, 1929 the following notes were made: Spots angular, limited

by the veinlets becoming confluent, immarginate, variable in size, reddish brown above, the red tint lacking below; conidio-phores amphigenous but more numerous above, fasciculate usually from a black tubercular base, dark olivaceous black by reflected light, continuous or 1-3 septate, straight, geniculate or somewhat undulate, $23-40 \times 3-4\mu$; conidia olivaceous, cylindrical but tapering at base, 1-6 septate, $14-57 \times 3\frac{1}{2}-5\mu$. The tufts are not numerous and are much scattered. Catenulation of conidia was not observed. A specimen from Kenosha county Oct. 4, 1909 labeled *Cercospora cephalanthi* E. & K. with the notation "spots different" is similar but with a few definite, orbicular, marginate spots and others that seem to be intermediate. Another specimen, same locality and date but probably from a different station shows only typical spots. In a collection from near Oakwood the spots are smaller, sordid and lacerate. It would seem that the reaction of the host to this parasite varies under different conditions. Of the Texan parasite described by Heald under the binomial *Ramularia cephalanthi* (E. & K.) Heald (*Bureau of Plant Industry Bulletin* 226, p. 61) I have not seen a specimen.

In "Notes" VII, p. 206 *Uromyces hyperici-frondosi* (Schw.) Arth. was reported on *Hypericum canadense* but the host appears to be *H. majus* instead.

The inclusion of Wisconsin in the range of *Puccinia windsorae* in *North American Flora* was an error as I am informed by Dr. Arthur.

Darker has shown that *Pucciniastrum arcticum* (Lagh.) Tranz. and *P. americanum* (Farl.) Arth. have their aecial stage on *Picea canadensis* and that *Peridermium ingenuum* Arth. is that stage (*Journ. Arnold Arboretum* 10:156 et seq.). To which of the raspberry rusts the *Peridermium* collected in Wisconsin belongs is not known. The situation is like that of *Peridermium balsameum* Pk. and *Uredinopsis* on ferns and *Caeoma* on *Larix laricina* and *Melampsora bigelowii* Thuem. and *M. medusae* Thuem. Such conditions suggest very close relationships.

In 1932 de Schweinitz published a description of a rust on *Andropogon* which he named *Puccinia andropogi*, usually corrected to *andropogonis*. Ten years earlier he recorded *Caeoma* (*Aecidium*) *pentastemonis* on *Pentstemon*. In 1899 Arthur

found that this is an aecial stage of the rust on *Andropogon* and other Scrophulariaceous hosts are known. In 1872 Peck published a description of *Aecidium mariae-wilsoni* on *Viola* and in 1878 von Thuemen described *Puccinia ellisiana* on *Andropogon*. These were found to be connected by Arthur in 1912. This has not been recognized in Wisconsin. In 1873 *Aecidium pustulatum* Curtis on *Comandra* was described by Peck. In 1903 Arthur found this to be connected with a rust on *Andropogon* and proposed the name *Puccinia pustulata* Curt. In *N. A. Flora* this was considered to be a race of *P. andropogonis*. In 1884 Ellis & Kellerman described *Aecidium ceanothi* on *Ceanothus* from Kansas. In 1909 Arthur succeeded in infecting *Ceanothus americanus* with germinating telia on *Andropogon Hallii* from Nebraska. It is of interest that sowing of the teliospores on *Baptisia tinctoria*, *Psoralea Onobrychis* and *Zanthoxylum americanum* among other hosts brought no result. The *Aecidium* on *Ceanothus ovatus* has been collected in northwestern Wisconsin but the stage on *Andropogon* has not been recognized. This was given the name *Puccinia ceanothi* by Arthur.

In addition to these *Puccinia Kaernbachii* (P. Henn.) Arth. occurs in Florida but its aecial connection is not known. *Uromyces andropogonis* Tracy (*U. pedatatus* (Schw.) J. L. Sheldon) having aecia on *Viola* and the later stages on *Andropogon* occurs in the United States and is thought to be closely related to *Puccinia ellisiana* Thuem. In *North American Flora* 7 proposed species of *Aecidium* on Leguminosae were united under the binomial *Aecidium onobrychidis* Burr. Of these two are known to occur in Wisconsin. One of them, *Aecidium falcatae* Arth., has been connected with rust of *Andropogon furcatus* as recorded in "Notes" XIV & XV. In 1929 *Andropogon furcatus* was infected in the greenhouse from the other, *Aecidium lupini* Pk. on *Lupinus perennis*. This connection has not been previously recorded. In 1926 connection of rust on *Andropogon furcatus* and *Aecidium xanthoxyli* Pk. was made in the greenhouse and was recorded in "Notes" XV. This was thought to be similar to the *Comandra-Andropogon* form. In 1927 rusted *Andropogon* from one source was found to infect *Polygala Senega* in the field but not that from another locality. Germination tests were not made before placing the rusted *Andropogon* plants as that was done early in the season. With the *Aecidium*

polygalinum Pk. thus produced *Andropogon furcatus* was infected in the greenhouse as recorded in "Notes" XVI.

It is evident that much is yet to be learned about the rusts of *Andropogon*.

ADDITIONAL HOSTS

Plasmopara pygmaea (Ung.) Schroet.

Conidia and young oospores on *Anemone virginiana*. Blue River.

Peronospora calotheca DBy.

On *Galium concinnum*. Sauk City. (Seymour, Jones & Davis).

A collection on *Potentilla arguta* bearing conidia only was preserved and referred to *Sphaerotheca humuli* (DC.) Burr. Perithecia have not been found on this host. A collection on *Shepherdia canadensis* from Bailey's Harbor is presumably of this species but only conidia are present.

Microsphaera alni (Wallr.) Wint.

On *Viburnum Opulus*. Fish Creek. In this collection the perithecia are small and scattered and the appendages short.

Melilotus alba should be recorded as a host of *Pseudopeziza medicaginis* (Lib.) Sacc. in Wisconsin.

A collection of the parasite recorded in "Notes" XVII, p. 300 as *Cercospora junci* n. sp. was made at Bailey's Harbor on *Juncus brachycephalus* Aug. 21, 1929 but mature conidia were not found on the dried material. The basal tubercles extend deeper into the leaf than in the type.

Uromyces acuminatus magnatus (Arth.)

Aecia on *Maianthemum canadense* collected at Lampson by Dr. Fassett have been so determined.

Uromyces hyperici-frondosi (Schw.) Arth.

Uredinia and telia on *Hypericum prolificum*. Bailey's Harbor.

Puccinia patruelis Arth.

Aecidium on *Lactuca sativa* (cult.) Madison. (A. C. Foster).

Puccinia bolleyana Sacc.

Uredinia and a few telia on *Carex Bebbii*. Jacksonport.

Satureja vulgaris should be included with the hosts of *Puccinia menthae* Pers. in Wisconsin.

Pucciniastrum pustulatum (Pers.) Diet.

On *Epilobium densum*. Menomonie. (Bachman & Patrick).

Calyptospora goeppertiana Kuehn is not common in Wisconsin. It was found at White Lake on *Vaccinium canadense* in 1921 and at Ellison Bay on *V. pennsylvanicum* in 1929.

Adjoining *Pteris aquilina* bearing *Sclerotium deciduum* Davis near Sturgeon Bay were single plants of *Trientalis americana*, *Fragaria virginiana* and *Rubus allegheniensis* infected apparently by the same parasite. Only the *Trientalis* bore typical sclerotia. The presclerotial stage was also found on *Trientalis* at Ellison Bay.

ADDITIONAL SPECIES

not previously reported as occurring in Wisconsin.

Taphrina aurea (Pers.) Fr.

This was collected at Terry Andrae Park on the shore of lake Michigan south of Sheboygan on *Populus nigra italicica*. The collection was made July 17th and the material was over-mature the spots having lost their yellow color and most, but not all, of the asci had discharged.

A scanty collection on *Iris lacustris* from Fish Creek in which the pycnidia are mostly immature or imperfectly developed is referred to *Phyllosticta cruenta pallidior* Pk. The sporules are about $10 \times 8-10\mu$.

A collection having the appearance of *Phyllosticta punctata* Ell. & Dearn. on *Viburnum Opulus* was made at Fish Creek but no sporules were found in the pycnidia. This is quite similar to *Phyllosticta decidua* Ell. & Kell. which occurs on shrubs as well as herbs and which often fails to develop sporules.

Ascochyta imperfecta Pk. on *Medicago sativa* appears not to have been recorded in the Wisconsin lists. In 1929 it was observed in a field of alfalfa and sweet clover mixed attacking the alfalfa only.

On July 10, 1929 a collection of *Peronospora linariae* Fckl. on *Linaria canadensis* was made at Arena. On the dead stems are pale spots in which are pycnidia with black rather firm thick

walls and broadly conical ostioles. These pycnidia contain hyaline, lax, filiform scolecospores $30-50 \times \frac{1}{2}-1\mu$. The appearance suggests that the death of the host interfered with the normal development of the sporules. Perhaps this bears relation to *Septoria cymbalariae* Sacc. & Speg.

Septoria pentstemonicola Ell. & Ev.

On *Pentstemon gracilis*. Mazomanie. Sporules $40-70 \times 3\mu$.

Cercospora dulcamarae (Pk.) E. & E.

On *Solanum Dulcamara*. Ellison Bay. In this collection the spots are dark blue on both surfaces reminding one of a wood stain.

Puccinia investita Schw.

Aecia and telia on *Gnaphalium decurrens*. Mellon. (Fassett).

Pucciniastrum galii (Lk.) Ed. Fisch.

Uredo on *Galium triflorum*. Ellison Bay. This rust appears to be very rare east of the Rocky Mountains.

University of Wisconsin Herbarium

April 1930

NOTES ON PARASITIC FUNGI IN WISCONSIN. - XIX.

J. J. DAVIS

Reprinted from the Transactions of the Wisconsin Academy of Sciences, Arts and Letters, Vol. 27, pp. 183-192.

1932



NOTES ON PARASITIC FUNGI IN WISCONSIN. XIX.

J. J. DAVIS

The summer of 1930 was hot and dry, which had a marked deterrent effect on the development of parasitic fungi.

SYNCHYTRIUM PULVEREUM Davis, on *Laportea canadensis*, having been found to bear summer sori similar to those of *S. cellulare* on *Boehmeria cylindrica*, is now referred to that species and the binomial reduced to synonymy.

Record has been made of the presence of *PERONOSPORA MELAMPYRI* (Bucholtz) in Wisconsin at Friendship and Radisson (as *PLASMOPARA MELAMPYRI* Bucholtz, Notes XVI, pp. 287-8). In July 1931 it was found at Washington Island with oospores, mostly immature, in the leaves. Those measured were globose, 27-33 μ in diameter; oogonia 40-50 μ . The conidia are strongly fuscous.

In "Notes" XI, pp. 294-295, record was made of the occurrence of *DOASSANSIA SAGITTARIAE* (West.) Fisch on *Lophotocarpus calycinus* at Blue River. The collection was a small one, there being but few host plants. In 1930 it was found in abundance at a station on the bottom lands of the Mississippi river near Glen Haven. As at the first locality no Doassansia was found on Sagittaria and as in the first collection the sori are often irregular. Field evidence points to close host adaptation as might be expected of parasites of this character.

In 1931 plants of *Amphicarpa monoica* were exposed to infection in the greenhouse from overwintered *Puccinia* on *Andropogon* from two localities without result. One of the localities was visited later and *Aecidium* on *Comandra umbellata* was found to be abundant there.

PESTALOZZIELLA SUBSESSILIS Sacc. & Ell. was recorded in the first supplementary list (1894) on the authority of Dr. Trelease who had found it at Madison on *Geranium maculatum*. It was not seen by the writer until May, 1930, when it was found at Viroqua on the same host. Examination of this collection shows that the sporules are formed in definite pycnidia in which there is apparently no ostiole, the spore discharge be-

ing through rupture. The genus therefore should find place in the Sphaeroidaceae. Notes on spore measurements read $17-30 \times 5-10 \mu$.

A specimen on an *Aster* of the *paniculatus* group collected May 18, 1929 bears sporules some of which exceed 80μ in length but has been referred to *SEPTORIA ASTERICOLA* Ell. & Ev. because they are but about 1μ in diameter. This species develops in spring, *S. ATROPURPUREA* Pk. in midsummer.

A specimen on *Solidago latifolia* from Kenosha Co. (July 4, 1892) was recorded in the Supplementary list as *SEPTORIA ATROPURPUREA* Pk. It has the following characters: spots circular to angular, 1-2 mm. or more elongate up to 4 mm. in length, dark purple above, pale below, often confluent and sometimes, by death of intervening tissue, forming pale brown areas; pycnidia epiphyllous, few, scattered, black, $60-80 \mu$ in diameter; sporules straight or somewhat curved, $37-66 \times 1\frac{1}{2}-2\frac{1}{2} \mu$. Another specimen (Kenosha Co., June 10, 1894) is more mature and bears larger spots, 4 mm. in diameter, which become paler in the center.

STIGMATEA ROBERTIANI Fr. on *Geranium robertianum*. Fish Creek. The material is not mature but appears to be of this species.

The Cercospora that occurs on *Smilax hispida* in Wisconsin was referred to *C. MISSISSIPIENSIS* Tracy & Earle in the fourth supplementary list and in the provisional list. In "Notes" X this was referred to *C. SMILACIS* Thuem. following Peck. Solheim refers it to *C. PETERSII* (B. & C.) Atk. which appears to be the proper designation.

ADDITIONAL HOSTS

A Synchytrium occurring in small quantity on *Fragaria virginiana* at Superior has been referred to *S. AUREUM* Schroet. It is much like the form on *Geum*.

BREMIA LACTUCAE Regel. On *Lactuca villosa*. Madison.

PLASMOPARA HALSTEDII (Farl.) Berl. & De Toni. On *Eupatorium purpureum*. Viroqua.

PERONOSPORA GRISEA Unger. In a collection of *Veronica serpyllifolia* from Reedsburg one of the plants bears a little of the mildew on the upper part of the stem.

PERONOSPORA POLYGONI Thuem. On *Polygonum Convolvulus*.
Lancaster. V. H. Young & J. J. Davis.

PUCCINIA HIERACII (Schwm.) Mont. On *Agoseris cuspidata*.
Pine Bluff. (N. C. Fassett).

STAGONOSPORA ATRIPLICIS (West.) Lind. On *Spinacia oleracea* (Cult.). Madison. This is S. SPINACIAE Ell. & Ev., which does not seem to me to be distinct. The sporules in this collection are $14-24 \times 6-8\mu$, 1-3 septate.

SEPTORIA HELLIANTHI Ell. & Kell. On *Helianthus scaberimus*. Spring Green.

COLLETOTRICHUM MALVARUM (A. Br. & Casp.?) Southworth.
On *Althaea* (Cult.). Baraboo. (L. R. Jones, 1911).

PHYLLACHORA GRAMINIS (Pers.) Fckl. On *Elymus striatus*.
Madison.

SEPTORIA RUDBECKIAE Ell. & Hals. On *Rudbeckia subtomentosa* on the Wisconsin river bottom lands in Iowa county. In this collection the white arid portion constitutes most of the spot which has a dark purple border. Similar spots, except that the border is brown, are usual on *Rudbeckia laciniata* but not on *R. hirta*. The development of the pycnidia on the arid spots is often poor.

Of a collection on twigs of *Viburnum Lentago* made at Arena June 4, 1929 the following notes were made: Accervuli various in extent on the young growth of the season often extending up the petioles, sometimes on the principal veins very exceptionally on the lamina, subcuticular, discoid; conidia soon erumpent in white masses, hyaline, cylindrical to fusoid, usually more or less acute at the proximal end, $12-23 \times 3\frac{1}{2}-6\mu$. This has been provisionally referred to *Gloeosporium cingulatum* Atk. Usually death of some of the young leaves results.

An OVULARIA on leaves on *Phalaris arundinacea* referred to O. PULCELLA (Ces.) Sacc. has been collected at Spring Green.

GLOMERULARIA CORNI Pk. var. LONICERAE Pk. On *Lonicera tatarica*. Madison. I have seen no record of the occurrence of this parasite on a host of foreign origin. The plants were growing, without cultivation, on the railroad right of way. Dearness & House consider the form on *Lonicera* to be spe-

cifically distinct. (*New York State Museum Bulletin. Report of the Botanist for 1921*, p. 85.)

CERCOSPORA FINGENS Davis. A scanty collection on *Thalictrum dioicum* from Mazomanie. Amphigenous.

RAMULARIA VIRGAUREAE Thuem. On *Solidago patula*. Conidia catenulate. Septation and catenulation often seem to be degrees of the same process.

CERCOSPORA DAVISII Ell & Ev. On *Melilotus officinalis*. Spring Green. While this parasite is common on *Melilotus alba* in Wisconsin it is much less frequent on *M. officinalis*. In this collection the leaflets bear also small arid barren spots resembling those caused by PHYLLOSTICTA DECIDUA Ell. & Kell. suggesting a prior infection by another parasite.

In *Mycologia* 21: 304 et seq. (1929) Horsfall reports results of examination of CERCOSPORA ZEBRINA Pass. on *Trifolium*, C. DAVISII E. & E. on *Melilotus alba* and C. MEDICAGINIS Ell. & Ev. on *Medicago* in which he failed to find definite morphological characters by which to separate them and proposed that they be united as a single species. In view of the variability of conidiophoral and conidial characters in this genus perhaps it is better to await the results of cross inoculation work and comparison of ascigerous stages, if such exist, before decision.

CERCOSPORA ANTIPUS Ell. & Hol. On *Lonicera dioica*. Washington Island.

CERCOSPORA GALII Ell. & Hol. On *Galium triflorum*. Solon Springs.

ALTERNARIA HERCULEA (Ell. & Mart.) Elliott. On *Brassica nigra*. Gratiot.

ENTYLOMA COMPOSITARUM Farl. On *Bidens vulgata*. Big Bend.

AECIDIUM PLANTAGINIS Burrill. The aecial stage of UROMYCES SEDITIOSUS Kern was found on *Plantago aristata* at Avoca May 28, 1929.

PUCCINIA BARTHOLOMÆI Diet. The aecial stage, AECIDIUM JAMESIANUM Pk. on *Asclepias tuberosa*. Ferry bluff, Sauk Co.

PUCCINIA CANALICULATA (Schw.) Lagh. II III on *Cyperus esculentus*. Gratiot.

Since the connection of Aecidium on *Erigeron* with a *Puccinia* on *Carex* was shown by Arthur all aecia on *Erigeron* in Wisconsin have been referred to *PUCCINIA CARICIS-ERIGERONTIS* Arth. (*Journ. Mycol.* 8: 53-4) now considered to be a race of *P. EXTENSICOLA* Plowr. which develops aecia on *Aster* and *Solidago* as well. Of the two rusts on *Cyperus* in Wisconsin *PUCCINIA CANALICULATA* (Schw.) Lagh. and *P. CYPERI* Arth. the former had been found to develop aecia on *Xanthium* (Arthur, *Journ. Mycol.* 12: 23) but the aecial host of the latter has been unknown. In conversation with Dr. H. S. Jackson he expressed the opinion that *P. CYPERI* Arth. develops its aecial stage on *Erigeron*. Recalling that abundant development of aecia on *Erigeron canadensis* had been observed in localities where *Cyperus* was abundant rusted material of *Cyperus Schweinitzii* bearing *P. CYPERI* was overwintered in the open and the following spring plants of *Erigeron canadensis* were brought into the greenhouse and infected from the overwintered material resulting in abundant aecia while the controls remained normal. This Aecidium is quite similar to the one on *Erigeron* connected with *PUCCINIA EXTENSICOLA* Plowr., the only difference that has been observed being a tendency to thickening of the spore wall at or near the apex as was pointed out by Dr. Arthur. The character is most readily seen when the spores are concatenate and hence are seen in side view. A collection on *Erigeron ramosus* from Spring Green is also referred to this species.

Telial material from the same station has since been used to infect *Erigeron annuus* in the greenhouse. This indicates that there is no physiological difference between the rust occurring on *Euerigeron* and that on what is considered by some to be the distinct genus *Leptilon*.

Although *PUCCINIA KARELICA* Tranz. has been collected in Wisconsin on *Carex* the aecial stage *AECIDIUM TRIENTALIS* Tranz. was not found until 1930 when it was collected on *Trientalis americana* in a large swamp near Cedarburg by A. M. Fuller and the writer.

PUCCINIA VIOLAE (Schum.) DC. Aecia on *Viola sagittata*. *Arena*.

A collection on *Asplenium acrostichoides* from Solon Springs is presumably *UREDINOPSIS COPELANDI* Syd. The fronds are

well infected but there are scarcely any uredospores and the teliospores do not furnish distinctive characters. Another collection on the same species of host from Haugen however bears both kinds of spores.

PUCCINIA MENTHAE Pers. On *Monarda didyma* (Cult.).
Madison. (Sam Chechik.)

PUCCINIA XANTHII Schw. On *Ambrosia psilostachya*. Spring Green.

The aecial stage of COLEOSPORIUM SOLIDAGINIS (Schw.) Thuem. occurs on needles of young planted trees of *Pinus resinosa* in Peninsula State Park.

The pre-sclerotial stage of SCLEROTIUM DECIDUUM Davis occurred at Viroqua on *Ranunculus septentrionalis*.

ADDITIONAL SPECIES

SYNCHYTRIUM FULGENS Schroet. The summer spore stage on *Oenothera biennis* was found under a railroad bridge at Brownstown.

SCLEROTINIA VACCINII Wor. On *Vaccinium macrocarpon*. Cranmoor. (E. E. Honey).

PHYLLOSTICTA PODOPHYLLI (Curt.) Wint. On *Podophyllum peltatum*. Big Bend.

A dead fallen leaf of *Pinus Strobus* from "the elephant's back" near "the dells" in Adams county bears what is probably VERMICULARIA LIBERTIANA Roum. The conidia are somewhat long, $10-13\mu$, and usually narrower and the bristles range up to 130μ in length. That this is parasitic is doubtful.

A small collection on a twig of *Pinus Banksiana* from Gotham, June 18, 1930, shows on dead needles depressed globose pycnidia $175-200 \times 135\mu$ in which develop deep brown (black in mass) fusoid-oblong sporules which became uniformly tri-septate, $16-20 \times 4-7\mu$; basidia indistinct. The uninfected needles on the twig were living. This probably bears relation to HENDERSONIA FOLIICOLA (Berk.) Fckl. with which it has been filed.

SEPTORIA FUMOSA Pk. A collection on leaves of *Solidago serotina* from Readstown, May 23, 1930, is referred to this spe-

cies. The spots are greyish brown, paler below, more or less angular and limited by the veinlets, sometimes confluent, 1-5 mm. in diameter; pycnidia epiphyllous, scattered, subepidermal, sometimes imperfect distally, about 100μ in diameter; sporules hyaline, curved, $50-75 \times 2\mu$. *Septoria davisii* Sacc. is probably not distinct from this.

Septoria cynoglossi n. sp. Spots definite, orbicular to irregular, brown, paler below, 2-5 mm. in diameter; pycnidia epiphyllous, scattered, rather thin-walled but usually with a more or less prominent black thickening around the pore, $50-80\mu$ in diameter; sporules straight, $20-30 \times 1\frac{1}{2}\mu$. On *Cynoglossum boreale*, Winneboujou, Wisconsin, August 9, 1930. The material is not mature and the sporules are probably larger when fully developed.

SEPTORIA HIERACICOLA Dearn. & House. On *Hieracium longipilum*. Spring Green. The spots are conspicuous but often sterile, the small pycnidia inconspicuous.

COLLETOTRICHUM SOLITARIUM Ell. & Barth. on *Solidago latifolia*. Washington Island.

CERCOSPORA BRIAREUS Ell. & Ev. On *Acerates viridiflora*. Spring Green. In this collection the conidiophores are shorter (mostly $20-35\mu$) and some of the conidia longer (100μ or more) than in the type as described.

PUCCINIA ARENARIAE (Schum.) Wint. On *Arenaria stricta*. Belmont. (N. C. Fassett.)

HYALOPSORA CHEILANTHIS (Pk.) Arth. On *Cryptogramma Stelleri*. Viroqua. (N. C. Fassett.)

UNIVERSITY OF WISCONSIN HERBARIUM,
APRIL, 1931.

INDEX TO "NOTES" XVIII AND XIX.

(Names of parasites in *italics*.)

Acerates viridiflora 189
Aecidium ceanothi 258
Aecidium falcatae 258
Aecidium jamesianum Pk. 186
Aecidium lupini Pk. 258
Aecidium mariae-wilsoni Pk. 258
Aecidium onobrychidis Burr. 258
Aecidium plantaginis Burr. 186
Aecidium polygalinum Pk. 259
Aecidium pustulatum Curtis 258
Aecidium trientalis Tranz. 187
Aecidium xanthoxyli Pk. 258
Agoseris cuspidata 185
Alternaria herculea (E. & M.) Ell-
ott 186
Althaea 185
Ambrosia psilostachya 188
Amorpha fruticosa 256
Amphicarpa monoica 183
Andropogon furcatus 253, 258
Andropogon Hallii 258
Anemone virginiana 259
Aquilegia canadensis 253
Arenaria stricta 189
Asclepias tuberosa 186
Ascochyta aquilegiae (Rabh.)
Hoehn. 253
Ascochyta imperfecta Pk. 260
Ascyrum stans 254
Asplenium acrostichoides 187
Aster (?) paniculatus 184, 254
Aster umbellatus 254
Baptisia tinctoria 258
Bidens vulgaris 186
Boehmeria cylindrica 183
Brassica nigra 186
Bremia lactucae Regel 184
Caeoma (Aecidium) pentastemonis
Schw. 257
Calyptospora goeppertiana Kuehn
260
Carex Bebbii 259
Ceanothus americanus 258
Ceanothus ovatus 258
Cephalanthus occidentalis 256
Cercospora antipus E. & Hol. 186
Cercospora briareus E. & E. 189
Cercospora cephalanthi E. & K. 257
Cercospora davisi E. & E. 186
Cercospora dulcamarae (Pk.) E. &
E. 261
Cercospora fingens Davis 186
Cercospora galii E. & Hol. 186
Cercospora gentianicola E. & E. 256
Cercospora hyperici Tehon & Dan-
iels 256
Cercospora junci n. sp. 259
Cercospora medicaginis E. & E. 186
Cercospora mississippiensis Tracy
& Earle 184
Cercospora molluginicola Lieneman
256
Cercospora molluginis Hals. 256
Cercospora molluginis Davis 256
Cercospora passaloroides Wint. 256
Cercospora petersii (B. & C.) Atk.
184
Cercospora smilacis Thuem. 184
Cercospora viticola (Ces.) Sacc. 256
Cercospora zebrina 186
Cladosporium gloeosporioides Atk.
254, 255
Coleosporium solidaginis (Schw.)
Thuem. 188
Colletotrichum 255
Colletotrichum cladosporioides (E.
& E.) Atk. 255
Colletotrichum gloeosporioides Pen-
zig 255
Colletotrichum malvarum (A. Br. &
Casp.?) Southworth 185
Colletotrichum solitarium Ell. &
Barth. 189
Comandra umbellata 183
Cryptogramma Stelleri 189
Cylindrosporium passaloroides
(Wint.) Gilman & Archer 256
Cylindrosporium tradescantiae Ell.
& Kell. 254
Cynoglossum boreale 189
Cyperus esculentus 186
Cyperus Schweinitzii 187
Doassansa sagittariae (West.)
Fisch 183
Elymus striatus 185
Entyloma compositarum Farl. 186
Epilobium densum 260
Erigeron annuus 187
Erigeron canadensis 187
Erigeron ramosus 187
Eupatorium purpureum 184
Fragaria virginiana 260, 184
Galium concinnum 259
Galium triflorum 186, 261
Geranium maculatum 183
Geranium robertianum 184
Gloeosporium 254
Gloeosporium balsameum Davis 253
Gloeosporium cingulatum Atk. 185
Gloeosporium cladosporioides Ell. &
Hals. 254, 255

Glomerularia corni lonicerae Pk. 185
Gnaphalium decurrens 261
Halenia deflexa 256
Helianthus scaberrimus 185
Hendersonia foliicola (Berk.) Fckl. 188
Hieracium longipilum 189
Hyalopsora cheilanthis (Pk.) Arth. 189
Hypericum adpressum 256
Hypericum canadense 257
Hypericum majus 257
Hypericum mutilum 254
Hypericum prolificum 259
Hypericum virginicum 255
Iris lacustris 260
Juncus brachycephalus 259
Lactuca sativa (Cult.) 259
Lactuca villosa 184
Laportea canadensis 183
Larix laricina 257
Leptothyrium tumidulum Sacc. 253
Linaria canadensis 260
Lonicera dioica 186
Lonicera tatarica 185
Lophotocarpus calycinus 183
Lupinus perennis 258
Maianthemum canadense 259
Medicago 186
Medicago sativa 260
Melampsora bigelowii Thuem. 257
Melampsora medusae Thuem. 257
Melilotus alba 186, 259
Melilotus officinalis 186
Microsphaera alni (Wallr.) Wint. 259
Monarda didyma 188
Mycosphaerella personata Higgins 256
Oenothera biennis 188
Ovularia pulchella (Ces.) Sacc. 185
Pentstemon gracilis 261
Peridermium balsameum Pk. 257
Peridermium ingenuum Arth. 257
Peronospora calotheca DBy. 259
Peronospora grisea Unger 184
Peronospora linariae Fckl. 260
Peronospora melampyri (Bucholtz) Davis 183
Peronospora polygoni Thuem. 185
Pestalotiella subsessilis Sacc. & Ell. 183
Phalaris arundinacea 185
Phyllachora graminis (Pers.) Fckl. 185, 253
Phyllosticta aquilegiae Tehon & Daniels 253
Phyllosticta astericola E. & E. 254
Phyllosticta cruenta pallidior Pk. 260
Phyllosticta decidua Ell. & Kell 186, 260
Phyllosticta podophylli (Curt.) Wint. 188
Phyllosticta punctata Ell. & Dearn. 260
Phyllosticta similispora Ell. & Davis 253
Phyllosticta sphaeropsispora E. & E. 254
Picea canadensis 257
Pinus Banksiana 188
Pinus resinosa 188
Pinus Strobus 188
Plantago aristata 186
Plasmopara halstedii (Farl.) Berl. & De Toni 184
Plasmopara melampyri Bucholtz 183
Plasmopara pygmaea (Ung.) Schroet. 259
Podophyllum peltatum 188
Polygonum Senega 258
Polygonum Convolvulus 185
Populus nigra italicica 260
Potentilla arguta 259
Pseudopeziza medicaginis (Lib.) Sacc. 259
Psoralea Onobrychis 258
Pteris aquilina 260
Puccinia andropogonis Schwein. 257, 258
Puccinia arenariae (Schum.) Wint. 189
Puccinia bartholomaei Diet. 186
Puccinia bolleyana Sacc. 259
Puccinia canaliculata (Schw.) Lagh. 186
Puccinia ceanothi Arth. 258
Puccinia cyperi Arth. 187
Puccinia ellisiana Thuem. 258
Puccinia hieracii (Schum.) Mont. 185
Puccinia investita Schw. 261
Puccinia Kaernbachii (P. Henn.) Arth. 258
Puccinia karelica Tranz. 187
Puccinia menthae Pers. 188, 260
Puccinia patruelis Arth. 259
Puccinia pustulata Curt. 258
Puccinia violae (Schum.) DC. 187
Puccinia windsorae 257
Puccinia xanthii Schw. 188
Pucciniastrum americanum (Farl.) Arth. 257
Pucciniastrum arcticum (Lagh.) Tranz. 257
Pucciniastrum galii (Lk.) Ed. Fisch. 261
Pucciniastrum pustulatum (Pers.) Diet. 260

Ramularia cephalanthi (E. & K.) Heald 257
Ramularia virgaureae Thuem. 186
Ranunculus septentrionalis 188
Rhabdogloeopsis 253
Rubus allegheniensis 260
Rudbeckia hirta 185
Rudbeckia laciniata 185
Rudbeckia subtomentosa 185
Satureja vulgaris 260
Sclerotinia vaccinii Wor. 188
Sclerotium deciduum Davis 188, 260
Septoria astericola E. & E. 184, 254
Septoria atropurpurea Pk. 184, 254
Septoria cymbalariae Sacc. & Speg. 261
Septoria cynoglossi n. sp. 189
Septoria davisii Sacc. 189
Septoria fumosa Pk. 188
Septoria helianthi E. & K. 185
Septoria hieracicola Dearn. & House 189
Septoria nolitangeris Gerard 254
Septoria pentstemonicola E. & E. 261
Septoria rudbeckiae E. & Hals. 185
Septoria tradescantiae (E. & K.) n. comb. 254
Shepherdia canadensis 259
Smilax hispida 184
Solanum Dulcamara 261
Solidago confinis 254
Solidago latifolia 184, 189
Solidago patula 186
Solidago rigida 253
Solidago serotina 188
Sphaerotheca humuli (DC.) Burr. 259
Spinacia oleracea 185
Stagonospora atriplicis (West.) Lind 185
Stagonospora spinaciae E. & E. 185
Stigmataea robertiani Fr. 184
Synchytrium aureum Schroet. 184
Synchytrium cellulare Davis 183
Synchytrium fulgens Schroet. 188
Synchytrium pulvereum Davis 183
Taphrina aurea (Pers.) Fr. 260
Thalictrum dioicum 186
Trientalis americana 187, 260
Trifolium 186
Uredinopsis 257
Uredinopsis copelandi Syd. 187
Uromyces acuminatus magnatus Arth. 259
Uromyces andropogonis Tracy 258
Uromyces hyperici-frondosi (Schw.) Arth. 257, 259
Uromyces pedatatus (Schw.) J. L. Sheldon 258
Uromyces seditiosus Kern 186
Vaccinium canadense 260
Vaccinium macrocarpon 188
Vaccinium pensylvanicum 260
Vermicularia libertiana Roum. 188
Veronica serpyllifolia 184
Viburnum Lentago 185
Viburnum Opulus 259, 260
Viola 258
Viola sagittata 187
Zanthoxylum americanum 258

NOTES ON PARASITIC FUNGI IN WISCONSIN. XX.

J. J. DAVIS

Reprinted from the **Transactions of the Wisconsin Academy of Sciences, Arts and Letters**, Vol. 30, pp. 1-16.

1937

19 AUG 1958

NOTES ON PARASITIC FUNGI IN WISCONSIN. XX

J. J. DAVIS

PERONOSPORA FLOERKEAE Kell. was collected by Holway in northwestern Wisconsin in 1904. When taking a collection of Entyloma on Floerkea from the press it was found that two small plants bore the Peronospora. The collection was made near Racine in southeastern Wisconsin May 15, 1933.

Petrak has proposed the genus Metacoleroa to receive VENTURIA DICKIEI (B.&C.) Sacc. (*Ann. Mycol.* 25: 332).

As there was some question as to whether the Taphrina that has been collected in Wisconsin on *Onoclea Struthiopteris* is T. STRUTHIOPTERIDIS Nishida or T. HIRATSUKAE Nishida a Wisconsin specimen was sent to Prof. Hiratsuka, who determined it as the former.

MYRCOCONIUM COMITATUM var. SALICTARIUM "Notes" IV, p. 286 is probably connected with SCLEROTINIA FOLLICOLA Davidson & Cash (*Mycologia* 25: 266-7 & 270).

In "Notes" XIII, pp. 171-2 GLOEOSPORIUM NIVEUM was described as occurring in ascomata of Rhytisma on *Ilex verticillata* and on species of Salix. There was discrepancy in the size and shape of the conidia on *Ilex* and in those on *Salix* and while both forms were described and figured under the binomial their specific relationship was left open. Dr. John Dearness has kindly sent material on *Ilex verticillata* collected near London, Ontario in which the conidia are like those on *Salix* but more acute. Similar collections on *Ilex* have also been made in Wisconsin and it seems clear that but one species is involved the conidia of which are somewhat variable in size and form.

MARSSONINA THOMASIANA (Sacc.) Magn. sometimes develops acervuli on the twigs. Young conidia are pyriform but the lower cell broadens with maturity.

In "Notes" XVII, p. 296 Colletotrichum on leaf spots on Streptopus, Oakesia, Smilacina and Uvularia was treated as parasitic and referred to C. PECKII Sacc. It now seems more probable that the spots were not caused by the Colletotrichum

but that it followed as a saprophyte. In May, 1933 Colletotrichum was found at Racine on leaves of *Trillium recurvatum*. The host plants were in a low place and had apparently been submerged after the heavy spring rains. They looked sickly and there were dead areas on the margins of the leaves sometimes extending toward the center. On the dead tissue Colletotrichum occurred. A specimen was sent to Dr. L. R. Tehon who reported that the fungus was like *COLLETOTRICHUM TRILLII* Tehon but that the spots were different. In June, 1933 Colletotrichum was found on dead and dying leaves of *Allium canadense* in the same region. A Colletotrichum on dead spots on leaves of *Smilax hispida* was found at Coon Valley in August, 1932. Perhaps these are all saprophytic and should be referred to *COLLETOTRICHUM LILIACEORUM* (Schw.) (*Vermicularia liliaceorum* Schw.). *COLLETOTRICHUM CIRCINANS* (Berk.) Vogl. on bulb scales of *Allium Cepa* perhaps belongs in the same group. However, in 1934 collections of Colletotrichum on leaves of *Clintonia borealis* were made at Hayward and Mellen, in which the fungus appears to be parasitic. The black acervuli are scattered on pale brown to cinereous spots which are sub-circular to oblong, $1-4 \times 1-2$ cm. sometimes confluent. Death of surrounding leaf tissue, especially distally, soon occurs. The setae are black, terete, up to $140 \times 6-10\mu$. Conidia hyaline, fusoid, slightly curved, acute, about $20 \times 3\mu$. It is probable that on full maturity of the fungus the entire leaf is dead. (See Burt Johnson, *Am. Journ. Bot.* 19: 12 et seq.)

In Wisconsin a leaf spotting fungus on *Smilax* has been referred to *STAGONOSPORA SMILACIS* (E.&M.) Sacc. which was published in the *American Naturalist* in 1882 as *ASCOCHYTA SMILACIS* E. & M. with the sporules characterized as "sub-hyaline" "triseptate" hence Saccardo transferred it to *Stagonospora* in the *Sylloge Fungorum*. In Wisconsin the sporules are usually hyaline and continuous when collected but colored and uniseptate sporules occur in some pycnidia. The sporules as ordinarily found in the pycnidia appear immature and the spots soon become lacerate and the tissue disintegrates. As septation so often comes but with maturity it was assumed that the parasite is the one that Ellis & Martin were dealing with. For further information the type specimen of *ASCOCHYTA SMILACIS* E. & M.

was sought but without success as it is not in the Ellis herbarium in New York or at Cambridge or Washington. Dr. Seaver kindly sent a portion of a specimen in the Ellis herbarium labeled *ASCOCHYTA SMILACIS* E. & M. which is in the state usually found with hyaline continuous sporules. It was on *Smilax hispida* collected in Ohio by Kellerman. Archer states that in a culture from *Smilax hispida* "some of the spores were hyaline and 1-celled but most were 1 or 2-celled and brownish in color." (*The Fungi of Iowa parasitic on Plants*, p. 434.) Spores having a median septum sometimes develop later a septum in each cell and it may have been this condition that led Ellis & Martin to describe the sporules as triseptate considering that to be the mature state (compare *STAGNOSPORA BAPTISIAE* (E. & E.) Davis "Notes" XVII, p. 295). Of *PHYLLOSTICTA SMILACIS* E. & E. the authors stated: "Specimens occur with uniseptate spores (*Ascochyta*) but usually there is no septum." They also stated: "This has been observed on various smooth-leaved species for twenty years or more but does not appear to have been described." (*Bull. Torr. Bot. Club* 27: 575 (1900).) *PHYLLOSTICTA SMILACIS* E. & M. appears to have been a herbarium name, at least I have seen no published description of it except in *North American Phyllostictas* 221 where *PH. SMILACIS* E. & E. is given as a synonym. Of this Ellis & Everhart state: "This species is found on various species of *Smilax* in different parts of the country and varies considerably in size and shape of the sporules. . . ." *SPHAEROPSIS SMILACINA* Pk. (33d Report, p. 24) was placed in this group by Dearness and taken as the type with the binomial *PHYLLOSTICTA SMILACINA* (Pk.) Dearness (*Mycologia* 9: 351.) This was referred to *Phoma* by Saccardo (*Syll. Fung.* 3: 160) *ASCOCHYTA SMILACIS* E. & E. was described as having smoky-hyaline, uniseptate sporules $6-8 \times 4\mu$ (*Journ. Mycol.* 8: 12.) *ASCOCHYTA CONFUSA* E. & E. was described as having smoky-hyaline sporules $7-12 \times 3\frac{1}{2}-4\frac{1}{2}\mu$. To the description is added the statement: "ASCOCHYTA SMILACIS E. & M. Am. Nat. Dec. 1882, p. 1002 has sporules $11-22 \times 6-7\mu$." Septation is not mentioned in the description of *A. confusa*. Of *DIPLODIA SMILACINA* Berk. on dead tendrils or branches of *Smilax* from Ohio and North Carolina little seems to be known in America. European specimens have been referred to it. *SPHAEROPSIS SMILACIS* E. & E. on dead stems of *Smilax* develops sporules similar to those that

are found on leaf spots. From their examination of a specimen of this species Gilman & Archer reported: "comparatively few of the spores were brown, still fewer were 1-septate, the majority were hyaline with granular contents thereby resembling the spores that are produced in the leaf spots." This appears to be about what one might expect from material not wholly mature. Of the variety *latispora* Pk. on dead branches of *Smilax hispida* Dearness stated: "Exceptional spores vary from 12-25 μ in length and in shape from globose to oblong-elliptic."

From examination of collections on living leaves of *Smilax herbacea* from Canada, sent to him by Dr. John Dearness, Bubak published the following species (*Hedwigia* 58: 15 *et seq.* (1917)):

PHYLLOSTICTA LONDONENSIS Bubak

& Dearness	Sporules 4.5-7.5 \times 2.5-3.5 μ
PHYLLOSTICTA PELLUCIDA B. & D.	" 5-7.5 \times 2-3.5 μ
PHYLLOSTICTA SMILACIGENA B. & D.	" 4-6 \times 1.5 μ
MACROPHOMA PELLUCIDA B. & D.	" 15-20 \times 4-5.5 μ
MACROPHOMA SMILACIS (E. & E.) B. & D.	" 16-28 \times 4-8 μ
ASCOCHYTA LONDONENSIS B. & D.	" 11-15 \times 3.5-4 μ
ASCOCHYTA FUSCOPAPPILATA B. & D.	" 15-22 \times 2-3 μ
ASCOCHYTA SMILACIGINA B. & D.	" 19-28 \times 4-8 μ
STAGONOSPORA PELLUCIDA B. & D.	" 20-25 \times 3.5-4 μ
STAGONOSPORA SMILACIGENA B. & D.	" 17-24 \times 4-7 μ
SPHAERELLA PELLUCIDA B. & D.	
PLEOSPHAERULINA CANADENSIS B. & D.	

The character of the spots, as described, is similar in all of these. Bubak suggested that **MACROPHOMA SMILACIS** (E. & E.) B. & D. may be conspecific with **SPHAEROPSIS SMILACINA** Pk. which was referred to Phoma, not Phyllosticta, by Saccardo in the *Sylloge Fungorum* 3: 160 where *Sphaeropsis brunneola* B. & C. on branches of *Smilax rotundifolia* was also referred to Phoma. Spots similar to those on Smilax are sometimes abundant on leaves of *Oakesia sessilifolia* but are largely sterile at the time when they have been observed. The pycnidia which they bear are those of **PHYLLOSTICTA OAKESIAE** Dearn. & House, and this seems to be closely related to the form on Smilax. The

condition on both hosts suggests that the thin leaves are not good substrates for full development. What is probably a more mature state of this was given the name DIPLODIA UVULARIAE n. sp. in "Notes" I, p. 87. This has brown, uniseptate sporules $12-20 \times 6-7\mu$. A form on *Uvularia grandiflora* with smaller sporules was given the name PHYLLOSTICTA DISCINCTA in *Trans. Wis. Acad. 4th Supplementary list*, pp. 747-8. This was later referred to *Ph. cruenta* (Fr.) Kx. as a variety based on a later collection with larger sporules ($16 \times 6\mu$). A still later collection on this host has sporules about $23 \times 6-7\mu$. What is perhaps a microconidial state of DIPLODIA UVULARIAE on *Uvularia grandiflora* was recorded in "Notes" V, p. 693.

It is of interest that while there is much diversity in the sporules in different collections on *Smilax*, *Oakesia* and *Uvularia* there is similarity in the leaf spots, except in PHYLLOSTICTA SUBEFFUSA (E. & E.) Tehon & Stout (*Mycologia* 21: 186) which does not appear to be a member of the group.

Gilman & Archer in the *Fungi of Iowa parasitic on Plants* (*Iowa State Journal of Science* 3: 433-4) included *Smilax* with *Polygonatum* and *Smilacina* as a host of SPHAEROPSIS CRUENTA (Fr.) Gilman & Archer. There seems to be no evidence that the sporules of PHYLLOSTICTA CRUENTA (Fr.) Kx. on *Polygonatum* or those of *Ph. PALLIDIOR* Pk. on *Smilacina* acquire color or septation at maturity. The forms on *Oakesia* and *Uvularia* however may be conspecific with that on *Smilax*. MELANOPS CRUENTA was described by Petrak as the ascigerous state of PHYLLOSTICTA CRUENTA. (*Ann. Mycol.* 25: 226, not 296 as indexed.)

PHYLLOSTICTA PALLIDIOR Pk. has been given varietal rank in Wisconsin publications but there is constant difference in the sporules, no intermediates having been found. MACROPHOMA SMILACINAE Tehon & Stout (*Mycologia*, 21: 187), on *Smilacina stellata* was described as having sporules $11-22 \times 3\frac{1}{2}-6\mu$. Spore color and septation are useful characters in classification but they sometimes cause confusion.

In "Notes" XIX, pp. 183-4 it was stated that the parasite referred to PESTALOZIELLA SUBSESSILIS Sacc. & Ell. should find place in the Sphaerioidaceae. Judging from the description its place is in DILOPHOSPORA GERANII Schroet. Through the kindness of Dr. C. W. Dodge I have examined a Wisconsin specimen

from the Trelease herbarium at the Missouri Botanical Garden and find it to be of the same character. In Ellis & Everhart's *North American Fungi* 1223 the sporules are also borne in pycnidia. *P. SUBSESSILIS* Sacc. & Ell. is the type species of the genus *Pestalozziella*. *P. GERANII-PUSILLA* C. Massal. is of the same character as far as can be determined from the poor specimens available. The type specimen of *PESTALOZZIELLA SUBSESSILIS* Sacc. & Ell. presumably in the Saccardo herbarium, should be reexamined and full development of the sporules should be observed in comparison with those of *DILOPHOSPORA ALOPECURI* Fr. = *D. GRAMINIS* Desm. as described and figured by Dr. Ernst A. Bessey in *Journal of Mycology* 12: 157-8. The setulae are distal only as stated by Schroeter.

In 1913 a parasite on leaves of *Carpinus caroliniana* was collected the character of which did not agree well with any of the genera that had been established and was described in "Notes" II, p. 107 under the binomial *FUSARIUM CARPINEUM* n. sp. Further notes and reference to its occurrence also on *Carya cordiformis* in small quantity were published in "Notes" XIII, p. 170 and XIV, p. 183 where it was suggested that it should be referred to *Septoriopsis* as that genus had been treated. Because of a previous use of the name by Fragoso and Paul this was changed to *Cercoseptoria* by Petrak (*Ann. Mycol.* 23: 69). In "Notes" X *CYLINDROSPORIUM CARYIGENUM* Ell. & Ev. was recorded as occurring in Wisconsin on *Carya cordiformis*. This species was referred to *Cercosporella* by von Hoehnel. The form on *Carpinus* and that on *Carya* are now considered to be conspecific and are labeled in the herbarium *CERCOSEPTORIA CARYIGENA* (E. & E.) n. comb.

In an article in the *Journal of Agricultural Research* 44: 139 *et seq.* entitled, "The Downy Spot Disease of Pecans," Demaree & Cole treat the fungus as a cause of disease of pecans and describe the ascigerous state as *MYCOSPHEARELLA CARYIGENA* (E. & E.) n. sp. In this connection it is of interest that *FUSICLADIUM EFFUSUM* Wint., referred to *Cladosporium* by Demaree, occurs on *Carpinus* as well as on *Carya* ("Notes" XVI, p. 285-6).

AECIDIUM MESADENIAE Arth. on *Cacalia reniformis* was recorded in the provisional list as *A. COMPOSITARUM*. The only Wisconsin collection was made in Kenosha Co. 1894. The locality is in south eastern Wisconsin, not north eastern as given in *North American Flora*.

ADDITIONAL HOSTS FOR WISCONSIN

ALBUGO CANDIDA (Pers.) O. Kuntze

On *Brassica juncea*. Madison (I. E. Melhus).

PLASMOPARA HALSTEDII (Farl.) Berl. & De Toni

On *Eupatorium purpureum*. Blue River. Killing the leaves which bear saprophytes, especially *Alternaria*.

On *Helianthus giganteus*. Westby.

MICROSPHAERA ALNI (Wallr.) Wint.

On *Lonicera oblongifolia*. Wind lake, Racine Co.

ERYSIPHE CICHORACEARUM DC.

On *Verbena hastata*. Madison.

PHYLLACHORA VULGATA Theiss. & Syd.

On *Muhlenbergia tenuiflora*. New Glarus.

DAVISIELLA ELYMINA (Davis) Petr. occurring in the locules of *Phyllachora* on *Elymus* was described as having sporules $7-10 \times 2\frac{1}{2}-3\mu$ ("Notes" V, p. 701). Petrak from examination of Wisconsin material gave the sizes of the sporules as $8-13 \times 3-4\frac{1}{2}\mu$ (*Ann. Mycol.* 22: 134). In "Notes" XIII, p. 166 there was reference to a form on *Calamagrostis* with sporules $10-20\mu$ in length. In a collection from De Soto Sept. 2, 1932 on *Muhlenbergia racemosa* the sporules are $10-16 \times 2-3\mu$. A collection on *Oryzopsis asperifolia* from Crivitz Aug. 25, 1931 shows sporules 12-20 mostly about 17μ long, nucleate but not yet septate. **DAVISIELLA DOMINGENSIS** Petr. & Cif. was described as having conidia $13-20 \times 2-2\frac{1}{2}\mu$ (*Ann. Mycol.* 30: 277). In collections on *Andropogon furcatus* from Sauk Co. (Greene & Davis) the sporules are 3- septate.

SEPTORIA DIDYMA Fckl. var. **SANTONENSIS** Pass. (**MARSONIA SANTONENSIS** (Pass.) Bubak).

On *Salix fragilis*. Princeton. This is quite different in appearance from the type as represented in Wisconsin on *Salix longifolia* and from Fuckel's *Fungi rhenani* 1677. The spots are angular, limited by the veinlets but confluent, dark brown becoming cream color or sordid white, the pycnidia sparse and imperfect. The sporules measured were $23-33 \times 2\frac{1}{2}-3\frac{1}{2}\mu$ uniseptate. In August 1933 this was collected south of Black Earth on *Salix alba* with well developed pycnidia the sporules, discharged in cirrhi on both leaf surfaces, $3-4\mu$ in diameter.

SEPTORIA RUMICICOLA Allesch.

On *Rumex mexicanus*. Madison. This name was proposed to replace *S. RUMICIS* Ellis on the supposition that it is distinct from *S. RUMICIS* Trail. (*Rabh. Krypt. Fl. Die pilze* 6: 848).

GLOEOSPORIUM SALICIS West. has been collected at Omro on a host identified as *Salix lucida* which is possibly a hybrid with *S. fragilis*.

MARSSONINA MARTINI (Sacc. & Ell.) Magn.

On *Quercus bicolor*. Blue River.

STAGONOSPORA MELILOTI (Lasch) Petr.

On *Melilotus officinalis*. This parasite has become quite common on *M. alba*.

CYLINDROSPORIUM CRESCENTUM Barth.

On *Pastinaca sativa* Westby. The conidia have a median septum.

RAMULARIA PRATENSIS Sacc.

On *Rumex britannica*. Omro.

CERCOSPORA PANICI Davis

On *Panicum Boscii*. Crivitz. I have not had an opportunity to compare this with *C. fusimaculans* Atk.

CERCOSPORA DESMODII Ell & Kell.

On *Desmodium nudiflorum*. Durand.

UROMYCES PLUMBARIUS Pk.

Aecia on *Oenothera rhombipetala*. Blue River.

PUCCINIA MUHLENBERGIAE Arth. & Hol.

On *Muhlenbergia tenuiflora*. New Glarus.

An Aecidium on *Desmodium grandiflorum* occurring with Aecidium on *Amphicarpa* on Ferry bluff in Sauk Co. is thought to be connected with PUCCINIA ANDROPOGONIS Schw.

PUCCINIA RUBIGO-VERA (DC.) Wint.

Telia on *Elymus striatus*. New Glarus.

PUCCINIA HEUCHERA (Schw.) Diet.

On *Heuchera sanguinea* (cult.). In a neglected rock garden at Baraboo.

CRONARTIUM RIBICOLA F. de W.

On *Ribes nigrum* (cult.). Sturgeon Bay (E. C. Blodgett). This locality is in north eastern Wisconsin.

ADDITIONAL SPECIES

not previously recorded as occurring in Wisconsin.

PHYLLACHORA MELICAE Dearn. & House

On *Melica striata*. Crivitz. Asci $65-70\mu$ spores $9-10 \times 5-6\frac{1}{2}\mu$. As stated by the authors this is near **PHYLLACHORA VULGATA** Theiss & Syd. and perhaps not distinct from **PH. GRAMINIS** (Pers.) Fckl. Collection of immature material on this host was referred to in "Notes" VIII, p. 418.

DERMATEA PHYLLOPHILA Pk.

Specimens on needles of *Abies balsamea* from Door County have been referred to this species.

PHOMOPSIS CALLISTEPHI Tehon & Daniels.

On *Callistephus chinensis* (cult.). Madison, Randolph and Milwaukee. (L. R. Jones & Regina S. Riker.)

From a scanty collection of living leaves of an undetermined species of *Panicum* from Crivitz the following notes were made: Spots fusoid, dark purple with an arid whitish center; pycnidia in the arid portion few, dark, depressed-globose thick-walled, opening by a pore, $100-130 \times 80-100\mu$; sporules hyaline, cylindrical to fusoid-cylindrical, straight, becoming 3-septate, $24-30 \times 3\frac{1}{2}-5\mu$. This has not been determined.

A poorly developed *Septoria* on *Heliopsis scabra* was collected at Coon Valley in August and has been referred to **SEPTORIA HELIOPSIDIS** Ell. & Dearn. The sporules are but about 1μ thick. In the infected leaves are also what appear to be immature perithecia.

SEPTORIA KRIGIAE Dearn. & House

On scapes and on involucral bracts of *Krigia virginica*. Mazomanie June 20, 1932. The black firm-walled pycnidia are prominent often breaking through the epidermis.

COLLETOTRICHUM HEPATICAE Pk.

On *Hepatica acutiloba* on dead spots caused by *Plasmopara pygmaea fusca* (Pk.) Davis. This is very doubtfully parasitic.

A specimen on dead leaves of (?) *Elymus* was collected at Racine June 25, 1888 and labeled *Vermicularia denudata* Schw. As it was not recognized as a parasite it was not recorded. Examination of the leaves shows that the acervuli are on light colored spots. This should now be referred to *Colletotrichum* but the specific name and the parasitism are open to question. The conidia seen were about $20 \times 3\mu$.

CYLINDROSPORIUM SOLITARIUM Heald & Wolf

On *Robinia Pseudo-acacia*. Princeton. Perhaps a form of the species on this host in Europe which has been referred to various genera.

BOTRYTIS HYPOPHYLLA Ell. & Kell. was described as occurring on leaves of *Teucrium canadense* which also bore *Cercospora "ferruginea."* Manneval reported it on *Cercospora hydropiperis* on *Polygonum hydropiper*, (*Univ. of Mo. Studies 1: 85.*) In Wisconsin it appeared to be parasitic on *Cercospora clavata* on leaves of *Asclepias incarnata*.

CERCOSPORA SETARIICOLA Tehon & Daniels

On *Setaria glauca*. Black Earth. In this collection the fasciculi are not usually as large as in the type as described and sometimes occur on the upper surface of the spots. Slender curved conidia up to 150μ in length are found. The conidia become pluriseptate.

MELAMPSORA EUPHORIAE-GERARDIANAE W. Mueller

Uredo on *Euphorbia commutata*. Beloit (Fassett).

PHRAGMIDIUM ROSAE-ARKANSANAE Diet.

Uredinia and telia on *Rosa pratincola*. Black Earth.

PUCCINIA BATESIANA Arth.

Aecia and telia on *Helianthus scaberrimus* in "Spring Coulee" between Westby and Coon Valley.

CERCOSPORA SENECIONICOLA n. sp.

Spots indeterminate, hypophyllous, becoming ferruginous; conidiophores hypophyllous, fasciculate on small scattered brown stromata, usually curved or tortuous and nodulose, more or less brown or fuscous, sometimes branched, $15-30 \times 3\mu$ conidia hyaline obclavate-cylindrical, usually straight, septate, $30-80 \times 2\frac{1}{2}-3\frac{1}{2}\mu$. On *Senecio aureus*. Coon Valley, Wisconsin,

August 13, 1932. Apparently distinct from *CERCOSPORA SENECIONIS* Ell. & Ev.

CERCOSPORA SENECIONICOLA sp. nov.

Maculis indeterminatis, hypophyllis dein ferrugineis; conidiophoris hypophyllis, fasciculatisque in parvis stromatibus brunneis dispersis, plerumque curvatis vel tortis alque nodulosis, plus minus brunneis vel fuscis, interdum ramosis $15-30 \times 3\mu$; conidiis hyalinis, obclavatis-cylindratis, plerumque rectis, septatisque, $30-80 \times 2\frac{1}{2}-3\frac{1}{2}\mu$ on *Senecionibus aureis*.

UNIVERSITY OF WISCONSIN HERBARIUM, MADISON, WISCONSIN
April, 1934.

ADDENDA

July 20, 1911 a Cercospora on *Spiraea salicifolia* was collected at Spooner and a description written under the binomial *Cercospora laxipes* n. sp. As there was some question as to its being a form of *Cercospora rubigo* Cke. & Harkness the description was published in the Appendix to the Provisional List as *Cercospora rubigo* Cke. & Hark. (?) Another collection from Nekoosa was described and the original description repeated in "Notes" VIII, pp. 428-9. This is now considered to be distinct and labeled *CERCOSPORA LAXIPES* n. sp. Another collection was made at Caryville.

In "Notes" XVI, p. 292 an Aecidium on *Galium tinctorium* was published as *Aecidium sparsum* n. sp. This binomial is antedated by *Aecidium sparsum* Haszlinsky 1877 and Dr. J. C. Arthur considers that the Aecidium is not distinct from *Aecidium houstoniatum* Schw. which as it occurs on *Houstonia coerulea* was connected with a Uromyces on *Sisyrinchium* by Sheldon and by Arthur. Sheldon however failed to demonstrate the connection with Aecidium on *Houstonia purpurea*. In Wisconsin Aecidium occurs on *H. longifolia* which is closely related to *H. purpurea* but no Uromyces has been seen on *Sisyrinchium* in the state although it has been looked for where the Aecidium occurred. An attempt to infect *Sisyrinchium* with aeciospores from *H. longifolia* in Wisconsin was without result. "Notes" XVI, pp. 283-4.

In the suppl. list p. 171 *Leptothyrium periclymeni* var. *americanum* E. & E. (*Trans. Wis. Acad.* 9: 171) was recorded. This

is now referred to *Kabatia lonicerae* (Hark.) Hoehn. but the Wind Lake, Racine county specimen is *Kabatia mirabilis* Bubak. (*Jour. Mycol.* 6: 116.)

Puccinia bartholomaei Dict. has been kept distinct from *P. vexans* Farlow because of the absence of amphispores and the development of aecia on Asclepiadaceae while the aecial stage of *P. vexans* was unknown. Development of aecia on *Asclepias tuberosa* and *A. syriaca* in the greenhouse through the agency of teliospores of *P. vexans* indicates that *P. bartholomaei* should be considered to be a form of *P. vexans* in which amphispores are not developed.

Phyllosticta similispora Ell. & Davis was described as occurring on *Solidago rigida*. It was later described as *Leptothyrium tumidulum* Sacc. on the same species of host. In Notes XVIII it was stated that hypophylloous pycnidia pushed into the mesophyl and were globose. The species has since been found on *Solidago serotina* which has firmer leaves and the pycnidia are similar on both leaf surfaces. It is perhaps best then to follow Saccardo and refer the species to *Leptothyrium*. If one takes the older specific name the binomial would be **LEPTOTHYRIUM SIMILISPORUM** (Ell. & Davis) n. comb.

ADDITIONAL HOSTS

BREMIA LACTUCAE Regel. On *Hieracium aurantiacum*. Mirabel and Stoney Creek, Kewaunee Co. Greene & Davis.

PERONOSPORA HEDEOMATIS Kell. & Su. On *Hedeoma hispida*. Blue River. Greene & Davis.

SPHAEROTHECA HUMULI (DC.) Burr. On *Potentilla fruticosa*. Bailey's Harbor.

ERYSIPHE POLYGONI (DC.) On *Polygonum ramosissimum*. Lone Rock. Perithecia not mature.

STAGONOSPORA MELILOTI (Lasch) Petr. On *Trifolium hybridum*. Coon Valley. (F. R. Jones.) Very scanty.

USTILAGO UTRICULOSA (Nees) Tul. On *Polygonum Careyi*. Tomah.

CRONARTIUM RIBICOLA F. deW. On *Ribes nigrum* (cult.). Sturgeon Bay. (E. C. Blodgett.)

TRANZSCHELIA PRUNI-SPINOSAE (Pers.) Diet. Aecia on *Anemone caroliniana*. Hager City. (Fassett & Hanson.)

PUCCINIA ARGENTATA (Schultz) Wint. Aecia on *Adoxa Moschatellina*. Ontario, Wis. (N. C. Fassett.)

PUCCINIA EXTENSICOLA HIERACIATA (Schw.) Arth. Aecia on *Hieracium longipilum*. Blue River. (Greene & Davis.)

CERCOSPORELLA NIVEA Ell. & Barth. On *Solidago hispida*. Hancock.

SPHAEROTHECA HUMULI FULIGINEA (Schlecht) Salm.
On *Bidens cernua*. Black Earth.
On *Bidens vulgata*. Muscoda.

STAGONOSPORA MELILOTI (Lasch) Petr.
On *Medicago sativa* (cult.). Madison. (F. R. Jones.)

CERCOSPORELLA NIVEA Ell. & Barth.
On *Solidago hispida*. Hancock.

SOROSPORIUM SYNTHERISMAE (Pk.) Farl.
On *Panicum dichotomiflorum* and *Panicum capillare*. Muscoda.

MELAMPSORA ABIETIS-CANADENSIS (Farl.) C. A. Ludwig.
(*M. populi-tsugae*, "Notes" IV, p. 676.)
Telia on *Populus balsamifera*. Bailey's Harbor.

PUCCINIA GRAMINIS Pers.
Uredia on *Cotabrosa aquatica*. Hudson. (Fassett.)

ADDITIONAL SPECIES

CYLINDROSPORIUM ROBINIAE (Lib.) Died. *Septoria curvata* (Rabh. & A. Braun) Sacc. is considered to be a synonym.
On *Robinia pseudoacacia*. Muscoda. In this collection the sporules are $2-4\mu$ thick and 3-10 septate. The pycnidia are inconspicuous.

SEPTORIA SONCHIFOLIA Cke.

On *Sonchus asper*. Hancock. Spots definite, becoming sorid white usually 3-6 mm., on dead areas; sporules $23-33 \times 1-1\frac{1}{2}\mu$.

MELANOPSICHIUM AUSTRO-AMERICANUM (Speg.) Fisch.

On *Polygonum lapathifolium*. McCartney. (Fassett & Evans.)

PUCCINIASTRUM SPARSUM (Wint.) Fisch.

Uredia on *Arctostaphylos uva-ursi*. Bailey's Harbor.

The American records of this rust are confined to the Pacific coast region. There is no record of its occurrence in America on this host.

RAVENELIA EPIPHYLLA (Schw.) Diet.

Uredia and telia on *Tephrosia virginiana*. Muscoda.

Apparently spreading from the railroad right of way.

PUCCINIA HYSSOPI Schw.

On *Agastache scrophulariaeefolia*. Viroqua. A single station in western Wisconsin.

PHYLLACHORA BOUTELOUAE Rehm. On *Bouteloua hirsuta*. Poynette. (Greene & Davis).

Of a collection on *Artemisia serrata*, Tomah, September 25, 1935 the following notes were made: Spots dark reddish brown, angular, variable in size, pycnidia amphigenous, globose, ca. 100μ ; sporules curved, acute mostly $50-70 \times 3-4\mu$. On leaves of *Artemisia serrata*, Tomah, Wisconsin, September 25, 1935. The majority of the pycnidia have undifferentiated contents. This is labeled in the herbarium as *SEPTORIA ARTEMISIICOLA* n. sp. A very destructive parasite of the leaves of *Iris lacustris* has been observed at Bailey's Harbor. In September leaves were brought to Madison and over-wintered outside. In the spring the perithecia developed asci $50-60 \times 13\mu$ and uniseptate hyaline ascospores $17 \times 5-7\mu$. The material was lost so no description of this *Mycosphaerella* is published. Apparently no conidia are developed.

COLLETOTRICHUM VICIAE Dearn. & Overholts. On *Vicia villosa*. Arena and Muscoda. Greene and Davis.

PHYLLOSTICTA ANEMONICOLA Sacc. & Syd. On *Anemone? canadensis*. Sauk Co. Oct. 15, 1935.

PUCCINIA SIMULANS (Pk.) Barth. Uredia on *Sporobolus cryptandrus*. Spring Green, Muscoda, and Lone Rock. In village streets.

OPHIOCLADIUM HORDEI Cav. On *Phalaris arundinacea*. Lone Rock and Durand. Distinguished from *Ovularia* by the tortuous conidiophores. Spring Green and Durand.

FUSICLADIUM ROBINIAE Shear. On seedling *Rubinia pseudoacacia*. Lone Rock.

UNIVERSITY OF WISCONSIN HERBARIUM,
MADISON, WISCONSIN.
FEBRUARY, 1937.

